



# Alerts for policy makers extracted from papers published during 2017 in volume 9 of Food Security

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This item summarizes very briefly some of the papers published in volume 9 of Food Security for the year 2017, drawing attention to current and future critical issues in food and nutrition insecurity and measures that could be adopted to ameliorate them. Papers are arranged under six headings: General; the Physical Environment; the Biological Environment (Food Production and Constraints); the Nutrition and Sociological Environment; the Economic and Political Environment; and Projects Encompassing Multiple Environments. It is hoped that Policy Makers concerned with food and nutrition security will note the papers relevant to their particular spheres of influence and that they will be inspired to take early action. Numbers after each entry refer to the pages on which the papers may be found in Volume 9 of the journal.

## 1 General

**We need radical change in how we produce and consume food** This short opinion piece by Peter Horton cannot be summarized easily and anyway deserves to be read in full by all who are concerned with how the still increasing population of the world is to be fed indefinitely (pp. 1323–1327).

**Production and improvement of cassava for food, feed, and industrial uses** Aditya Parma and co-authors draw attention in this paper, which is part of our series “Crops that feed the World”, to cassava’s great importance as a food security crop in tropical America, Africa, and Asia. In particular the crop serves as a staple and famine reserve, producing yields of around 10 ton/ha even on poor soils. However, it suffers severely from disease, in particular cassava mosaic disease

(CMD), cassava brown streak disease (CBSD) and cassava bacterial blight (CBB). These require concerted efforts to reduce their ravages. Other problems that inhibit the use of cassava are post-harvest physiological disorder (PPD) and cyanogenic glycosides (CG). Cassava is now also becoming a cash crop, used in the production of starch (and starch based products), energy (bio-ethanol) and livestock feed in the major producing countries (pp. 907–927).

## 2 The physical environment

**Spatiotemporal change of cultivated land effects on food production potential in China** Xinliang Xu and co-authors found that, although the total area of cultivated land in China increased between 1990 and 2010, the food-energy production decreased by  $9.64 \times 10^{12}$  kcal. This was because crop production per unit area of land lost (mainly to construction) was much greater than that of land gained. The authors state that the data provide useful information for the development of land policy, involving protection of suitable arable land and urban development plans (pp. 33–43).

## 3 The biological environment: Productivity and constraints

Papers that may be considered under this heading fall into four categories and are primarily concerned with crop plants: availability of suitable plant material; cultivation; pests and diseases. Lately, more consideration has been given to the fourth category, insects as food, and this is represented by two papers.

### 3.1 Availability of suitable plant material

**Threats to food sufficiency among smallholder farmers in Choma, Zambia** The paper by Kabwe Mubanga and Willem Ferguson demonstrates one factor that makes food security for

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a population difficult. They found that the annual increase in population was 2.6%, which, despite Government incentives for maize farming, outstripped increases in its production. These incentives, the authors suggest, have encouraged maize mono-cropping at the expense of food sufficiency and advise that the production of other agronomically suitable crops could reduce food insufficiency in the region. Will this advice be heeded? (pp. 745–758).

**The impact of new Rice for Africa (NERICA)** In contrast to the previous paper, Lamin Dibba and co-authors found that NERICA rice, a hybrid of *Oryza glabberima* (African rice) and *O. sativa* (Asian rice), enhanced household food security in the Gambia by 14%, enabling the acquisition of a more diverse diet, which included cereals, tubers, pulses, vegetables and fruits. However, despite this more varied diet there was no impact on human health (pp. 929–944).

**The advantages of flood tolerant rice** Manzoor Dar and co-authors point out that 30% of the rice growing area in India (12–14 M ha) is subject to flash floods, the coastal area of Odisha State being particularly prone. As a precaution, farmers grow low yielding land races because of their flood tolerance. However, the flood tolerant variety Swarna-Sub1 gave yields of about twice that of these varieties, whether floods occurred or not. Moreover, there was a social advantage in that poor farmers belonging to scheduled castes had greater numbers of plots in areas subject to prolonged floods so they benefited proportionately more from the introduction of the flood tolerant variety (pp. 711–722).

### 3.2 Cultivation

**Sustainable intensification options for smallholder maize-based farming systems in sub-Saharan Africa** Klaus Droppelmann and co-authors evaluated 17 published multi-year and multi-site studies. In consequence, for maize intensification they recommend expanding farmer access to multipurpose legumes e.g. long-duration pigeon pea, which provides food, copious biomass and organic N fertilizer. Additionally, farmers should practise water-conserving, tillage techniques that are adapted to the local environment (pp. 133–150).

**Conservation agriculture** Christian Thierfelder and co-authors evaluated conservation agriculture from the standpoint of how climate smart it is in terms of resilience and adaptation to climate change, mitigation of climate effects by sequestering carbon, reducing greenhouse gas emissions and sustainably increasing productivity and income. One immediate benefit of CA is to reduce the requirement for labour but increased productivity and profitability are usually recorded only after

2–5 cropping seasons. The authors stress that there is an urgent need for more data quantifying these effects and that possible co-interventions, such as improved cropping/relay cropping systems and agro-forestry may deliver further benefits (pp. 537–560).

#### **Wheat intensification in the Eastern Indo-Gangetic Plains**

Alwin Keil and co-authors point out that zero-tillage (ZT) is a proven technology for sustainable wheat intensification, which could be adopted with advantage in the Eastern Indo-Gangetic Plain. However, in a random sample of 1000 farmers in that area only 44% were aware of the technology. The authors advocate awareness campaigns and more ZT service providers (pp. 723–743).

#### **Fertilizer use and maize productivity in Ghana**

Catherine Ragasa and Antony Chapato found that the addition of 1 Kg of nitrogen fertilizer per hectare led to an increase of 22–26 Kg/ha of maize in Ghana but actual rates of application were much lower than the optimal 225 Kg/ha. Other limiting factors were the lack of access to modern varieties, mechanization and hired labour (pp. 329–353).

#### **Yield of maize in response to nitrogen fertilizer**

Bashir Jama and co-authors provide extensive data showing the benefits of applying nitrogen fertilizer to maize. In a comparison of yield responses at 940 demonstration sites across Malawi, Mozambique and Zambia, average yields were 2.8 t ha<sup>-1</sup> and 4 t ha<sup>-1</sup> where ≤50% and 100%, respectively, of the recommended dose of nitrogen was applied, compared with an average yield of 1.6 t ha<sup>-1</sup> without nitrogen application (pp. 577–593).

### 3.3 Pests and diseases

#### **Yield effects of rust-resistant wheat varieties in Ethiopia**

The paper by Zewdu Abro and co-authors emphasises the importance of selecting varieties of crop plants which are adapted to all aspects of their local environments. Stripe rust of wheat caused by the fungus *Puccinia striiformis* f. sp. *tritici* is a serious disease in Ethiopia. In this study, the performance of improved wheat varieties that were rust resistant was compared with improved susceptible varieties and traditional susceptible varieties. The yield of the improved resistant varieties was only slightly better than the improved susceptible varieties, owing to low rust levels in the years of the study, but both performed worse than traditional varieties in the presence of drought and other abiotic stresses. This result probably explains why many farmers have switched back to traditional varieties. A particular problem with biotic stresses, such as rusts, is that their virulence evolves to overcome resistance, necessitating the introduction of further resistance genes (pp. 1343–1357).

**Impact assessment of push-pull pest management in Eastern Uganda** The report of Ruth Chepchirchir and co-authors makes a prima facie case for rolling out this amazingly successful biological control technique across much of sub-Saharan Africa. Not only does it simultaneously control stemborers of cereals and the devastating parasitic weed, *Striga*, but also improves soil fertility by employing legumes as part of the technique. Consequently, as reported in this study from Uganda, there was an improvement in livelihoods (pp. 1359–1372).

### 3.4 Insects

**Insects as food** Mohammed Alemu and co-authors found that buns made with 5% cricket flour were preferred in comparison with buns made with 10% or no cricket flour and suggest that the addition could be a nutritious supplement to diet (pp. 471–484).

**EU law and edible insects** Simone Belluco and co-authors point out that stakeholders in a number of European and other countries have supported the legalization of edible insect consumption in Europe but this only the first step. The benefits and safety of new foods must be assured for producers and consumers by clear legislation (pp. 803–814).

## 4 The nutrition and sociological environment

The five papers under this heading are diverse, the first two dealing rather directly with nutrition, the third indirectly through rituals that contribute to social capital needed for crop production, and the last two, also indirectly, concerning improved fish production.

**Complementary feeding practices among children aged 6–23 months in southern Benin** Irene Mitchodigni and co-authors point to many factors that could improve the health of children during the time they are progressing from breast feeding to being able to eat with the family. These include food group diversification and overall social support, in particular the reduction of women's workload, allowing them more time for child care (pp. 1117–1130).

**Assessing and improving food aid distribution in developing countries** Kathryn Grace and co-authors state that undernutrition is the cause of nearly half the deaths of all children under the age of 5. Taking Mali as their case study, they propose a spatial analytic programme. One particular outcome of the study was that existing food aid outlets should be reallocated to more densely populated areas where vegetation is scant. The authors suggest that this approach would reduce food insecurity and increase the cost effectiveness of targeting food aid (pp. 867–880).

**Rituals in Timor-Leste** Martin Browne and co-authors found that although considerable time and resources were spent on rituals in Timor-Leste, these made an important contribution to social capital, which was needed for crop production and food security (pp. 441–451).

**Small fish from pond polyculture can improve nutrition** Sarah Castine and co-authors draw attention to the fact that generally large fish, such as carp, occupy homestead ponds in Bangladesh and small indigenous fish are usually poisoned under the mistaken view that they compete with the carp for food. However, these small species, such as 'mola', if consumed whole, provide an important source of nutrition as they are rich in micronutrients, including vitamin A, iron and zinc. The authors therefore advocate polyculture of carp and small fish. They further suggest that, as homestead ponds are uniquely accessible to women who prepare the household food, dissemination of carp-small fish technology could provide an opportunity for training men and women together in fish production and consumption, nutrition and gender equity (pp. 785–801).

**Impacts of community-based fish culture in seasonal floodplains on income, food security and employment in Bangladesh** A.B.M. Mahfuzul Haque and Madan Dey found that fish production, income and food security were improved in the flood plains of Bangladesh by the adoption of an equitable and inclusive multi-stakeholder approach. Average fish production increased from 124 kg/ha/year to 464 kg/ha/year and income of households participating in the project was 3.74 times that of a control group (pp. 25–38).

## 5 The economic and political environment

The four papers in this section are also disparate, dealing with negative effects of growing cash crops in Senegal, food security of the Inuit in Canada, improvement of the public food distribution system in the Odisha State of India and approaches to women's empowerment in the cultivation and marketing of crops.

**Cash crops reduce the welfare of farm households in Senegal** Mahamadou Tankari found that, although the production of cash crops is often regarded as a means by which poverty in Developing Countries may be overcome, the result in Senegal was the opposite. The author therefore suggests that Senegal must focus more on promoting food crops and supporting the efficient functioning of markets (pp. 1105–1115).

**Inuit food security in Canada** Paul Watts and co-authors draw attention to the importance of marine catch – both fish and mammals – to the Inuit diet. They advocate, inter alia, a re-evaluation of Canada's northern transfer and land claim

agreements in order to comply with the United Nations Declaration on the Rights of Indigenous People (pp. 421–440).

**Food security in Odisha, India improved by better governance of the public food distribution system** Anjani Kumar and co-authors report that the public food distribution system (PDS) has improved enormously over the last 14 years owing to expansion of its coverage (from 6.4% of households in 1993–1994 to 58.3% in 2011–2012) as well as on account of lowering of prices and simplification of entitlements (pp. 1433–1445).

**Women's empowerment in Indian agriculture: The role of market orientation in farming systems** Soumya Gupta and co-authors studied the relationship between the Women's Empowerment in Agriculture Index (WEAI) and market orientation of farm production in India. They found that the relationship was strong, suggesting that linking women to markets could be a means by which their empowerment in agricultural domains could be enhanced. Areas in which relevant policies could be designed, tried and studied are: ensuring that women are able to make decisions about cultivation of crops; their participation in the sale of those crops; and that they benefit from the income associated with the sale (pp. 1447–1463).

## 6 Projects encompassing multiple environments

**Effects of a participatory Agroecological development on household wealth and development** Joseph Kangemaang and co-authors draw attention to the urgent need for

changes in farming practices in sub-Saharan African, owing to land degradation, high levels of food insecurity and anticipated climate change. They report the success of an agroecological project in Malawi and suggest that further developments should include upscaling of farmer-to-farmer knowledge exchanges, community involvement and attention to nutrition and social equity (pp. 561–76).

**The potential for conflict in Uzbekistan owing to sub-optimal use of water availability and crop choice** Donna Mitchell and co-workers give a background to the current position in Uzbekistan regarding water use and crop choice, pointing out that, in the Soviet era, cotton production dominated agriculture and was irrigated by two rivers, the Amu Darya and the Syr Darya. These feed into the Aral Sea, which as a result of their diversion has shrunk by 90%, causing untold ecological and social damage. Further damage is caused by market distortions owing to quotas for cotton, which are still in place. The authors show that, if quotas were removed, Uzbekistan would have the ability to become self-sufficient in wheat production (pp. 697–709).

**Food security in a remittance based economy** Madhav Regmi and Krishna Paudel, unsurprisingly, found that households in Nepal receiving international remittances from Nepalese working abroad were more food secure than those that did not (but shouldn't the local agriculture and economy be developed so that the mass exodus of young people for extended periods, who provide the remittances, be unnecessary? Ed.) (pp. 831–848).