WN Update

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Editor's note. As from now, *Update* will include more relatively substantial contributions on big issues of public health and nutrition that we identify as needing to be emphasised and addressed. Here we start with two warnings, on the impact of world climate disruption on water, and on the impact of current political, economic and social policies on biodiversity. We continue with plans by Mark Bittman, Michael Pollan and others for US food policy, and by Olivier de Schutter for global food policy. Finally, Pilar Zuzueta's *Vision* of this century.



WN *Climate disruption*

No water means no food

Access January 2014 Tony McMichael on climate disruption here
Access March 2014 IPCC report on food systems impacts here
Access April 2014 Editorial on climate disruption and food systems here
Access May 2014 Editorial on climate disruption and food systems here
Access October 2014 Naomi Klein, Tony McMichael et al on climate disruption here
Access New York Times September 2015 Bailey and Benton on climate shocks here



Droughts made worse by climate disruption are the greatest threat to food security. No water means no food. In causing hunger they are sparking unrest, population flight, riots, uprisings and wars

The Update team reports:

Climate disruption is the greatest threat to food security and general security in the world. As one example, in 2011 a heatwave in Russia caused the country's worst drought in 40 years, precipitating food riots in North African countries as prices of bread rose rapidly. Tim Benton, academic director of the Global Food Security Programme, and Rob Bailey, research director for Energy, Environment and Resources at Chatham House in London, have analysed the chances of extreme weather events causing food shocks as the world warms over the coming century.

Production disruption of rice, wheat, maize and soybeans is likely to increase from a 1 in 100 to a 1 in 30 year event by 2040. From 2070 onwards severe shocks, which could see global production drop by 10 per cent, could be happening in seven out of ten years. These shocks will have greatest impact across Africa and the Middle East. Meanwhile, the Food and Agriculture Organization states that increasing population will drive need for food up by 60 per cent by 2050. Kirsty Lewis from the UK Meteorological Office says:

> What we do see quite clearly is that events that are very rare in the present day are becoming more frequent in the future. The most extreme events of the future are likely to become more intense, meaning larger shocks and more frequent shocks.

Tim Benton says

> We've got these pressures on the food system, part of which is climate change. But we're highlighting the fact that with weather variability and increases of extremes we are adding a layer of difficulty. Because it happens suddenly within a year, it is more difficult to adjust slowly like we'd cope with demand increases. If we are coping with demand increase by sustainable intensification, but then we suddenly have a catastrophic year, and we lose a big chunk of the world's calories, everybody will feel it. In a sense what we see with the Islamic State today was sparked by food price rises.

Rob Bailey says

> The most vulnerable countries that are going to be worst affected are low income food-deficit countries, predominantly those in sub-Saharan Africa. You can imagine that the poorest households in these sorts of countries are spending upwards of 50 per cent of their income on food. So if food prices are increased by 50-100 per cent, this leaves them in an almost untenable position.

Governments must understand the risks, rather than simply stockpiling food and grains. World trade needs reform, so that countries do not retreat behind barriers when crops fail. Research on agriculture must be carried out to ensure it can cope with increased demand and increasing temperatures. Two imaginative approaches that have been suggested to alleviate threat of protein deficiency are promotion of diets that include edible insects, and meat grown in laboratories.

The Update team. No water means no food
[Climate disruption] World Nutrition September-October 2015, ***6****, 9-10, 667-668*

Biodiversity destruction

The sixth mass extinction is here and now

Access June 2015 Science Advances on the sixth mass extinction here

Update team note. This *Update* is edited and abbreviated from a fully referenced paper recently published in Science Advances, the journal of the American Association for the Advancement of Science, by Gerardo Ceballos, Paul Ehrlich, Anthony Barnosky, Andrés García, Robert Pringle and Todd Palmer, from universities in Mexico and the US.



Numbers of very many animal, bird and insect species are falling fast, and many species are becoming extinct. With bees (above) and other insects killed off by overuse and abuse of toxic pesticides, this is a direct threat to human food systems, and most of all to fresh plant foods

The average rate of vertebrate species loss over the last century is up to 114 times higher than the background rate. The number of species that have gone extinct in the last century would have taken at the background rate, between 800 and 10,000 years to disappear. These estimates reveal an exceptionally rapid loss of biodiversity over the last few centuries, indicating that a sixth mass extinction is already under way. Averting a dramatic decay of biodiversity and the subsequent loss of ecosystem services is still possible through intensified conservation efforts, but that window of opportunity is rapidly closing.

Extinction follows industrialisation

Modern extinction rates have increased sharply over the past 200 years, corresponding to the rise of industrial society, and are considerably higher than background rates. Rates of modern extinctions vary among vertebrate groups. For example, amphibians, comprising around 7300 species, show an accelerating rate of extinction. Only 34 extinctions have been documented with a high level of certainty

since 1500, yet over 100 species have likely disappeared since 1980. This does not include species not yet evaluated, such as reptiles and fish.

Our results indicate that modern vertebrate extinctions that occurred since 1500 and 1900 CE would have taken several millennia to occur if the background rate had prevailed. As said, the total number of vertebrate species that went extinct in the last century would previously have taken about 800 to 10,000 years to disappear. The particularly high losses in the last several decades accentuate the increasing severity of the modern extinction crisis.

Arguably the most serious aspect of the environmental crisis is the loss of biodiversity – the other living things with which we share Earth. This affects human well-being by interfering with crucial ecosystem services such as crop pollination by bees and water purification and by destroying humanity's beautiful, fascinating, and culturally important living companions. Our analysis shows that current extinction rates vastly exceed natural average background rates. We emphasise that our calculations very likely underestimate the severity of the extinction crisis because our aim was to place a realistic 'lower bound' on humanity's impact on biodiversity.

The sixth mass extinction is now

While biologists cannot say precisely how many species there are, or exactly how many have gone extinct in any time interval, it is certain that modern extinction rates are exceptionally high, that they are increasing, and that this suggest a mass extinction under way, the sixth of its kind in Earth's 4.5 billion years of history.

The evidence is incontrovertible that recent extinction rates are unprecedented in human history and highly unusual in Earth's history. Our analysis emphasises that human activity has started to destroy species of other organisms at an accelerating rate, initiating a mass extinction episode unparalleled for 65 million years.

If the currently elevated extinction pace is allowed to continue, humans will soon (in as little as three human lifetimes) be deprived of many biodiversity benefits. On human time scales, this loss would be effectively permanent, because in the aftermath of past mass extinctions, the living world took hundreds of thousands to millions of years to rediversify.

Avoiding a true sixth mass extinction will require rapid, greatly intensified efforts to conserve already threatened species and to alleviate pressures on their populations – notably habitat loss, overexploitation for economic gain, and climate change. All of these are related to human population size and growth, which increases consumption (especially among the materially rich), and economic inequity. However, the window of opportunity is rapidly closing.

The Update team. The sixth mass extinction is here and now [Biodiversity destruction] [Update]. World Nutrition September-October 2015, ***6,*** *9-10, 669-670*



***WN** The Food System*

US food: plan for the next President

Access December 2014 Mark Bittman et al on US and global food policy here
Access October 2015 Mark Bittman et al on US food policy here



The US needs a national food policy fit for these times. Mark Bittman, Michael Pollan, Ricardo Salvador, Olivier de Schutter (from left above) have written one, for the next US president to enact

Editor's note

This *Update* in our series in this issue of *WN* on the global food crisis and how to face it, is edited and abbreviated from the fully referenced October 2015 '*A national food policy for the 21st century'*, by Mark Bittman, long-time food columnist for *The New York Times;* author and campaigner Michael Pollan, a member of the *WN* editorial family; food policy authority Ricardo Salvador; and former UN special rapporteur on food Olivier de Schutter, also a *WN* supporter It follows their manifesto presented at the New York Times *Food for Tomorrow* meeting late last year, summarised in *Update in December 2014*.

Draft for a statement in the new US president's State of the Union address to be delivered on 28 January 2017

Thanks to the productivity of our farmers, the United States has led the world in agriculture for generations. But the challenges facing the US food system have shifted. We need to do more than produce an abundance of cheap calories. Too many of our children are struggling with obesity and diabetes, while many adults struggle with chronic preventable diseases linked to diet, costing us more than $ 500 billion a year. We must commit not just to feeding but to nourishing our citizens, especially our children. We can do this by honouring our great tradition of small family farms, and by building a food system that works with nature while continuing to be productive and profitable.

To that end, I am announcing the creation of a task force reporting directly to me and charged with developing the nation's first National Food Policy. This policy will be organised around the paramount objective of promoting health – that of our citizens and of the environment – in each link in the food chain, from the farm to the supermarket, to our schools, home tables, and restaurants. With the development of this policy, we will demonstrate that the American food system can continue to be a model that the rest of the world can follow.

The US government has never before had a national food policy, let alone one that seeks at the highest level to align federal agriculture policies with our public health and environmental objectives. Were the next president to inaugurate such a policy, and by executive action establish the mechanisms for its implementation, the potential to drive long-term change in three critical issues of our times – health care, climate change, and economic equality – would dramatically increase

An integrated policy

Sustained progress on all three of these issues will be limited unless progress is made in addressing a fourth, seemingly less salient issue: the health, sustainability, and fairness of the food system. The National Food Policy specified here is therefore not simply about food. It's about health, it's about rural landscapes, it's about the environment, it's about education, and it's about poverty. It is also, ultimately, about whether democracy can respond – about our ability to move away from the policies we've been trapped in since the 1970s. The problems have changed since then; the change in policies to meet the new challenges we face is long overdue.

The current and future well-being of the nation can be significantly improved by creating a National Food Policy. Such a policy, if properly conceived and implemented, will result in a healthier population, a reduction in hunger, mitigation of (and adaptation to) climate change, decreases in energy consumption, improved environmental conservation, rural and inner city economic development, a reduction in socioeconomic inequality, a safer and more secure food system, and savings to the federal budget, especially in spending on health care.

The very idea of a comprehensive 'food system' is new. The next US government administration has an opportunity to innovate and lead on the major issues of our times, nationally and internationally, by demonstrating its grasp of this reality. Previous administrations have failed to appreciate the linkages between farming, diet, public health, and the environment, with the result that the food system has never been effectively overseen, administered, or regulated. This in turn has resulted in severe market failures that we call by other names: the obesity crisis, runaway hunger, epidemics of chronic disease, the ethanol bubble, surface water contamination and hypoxia, soil degradation, food safety scares and recalls, rural economic decline, inner city food deserts, labour exploitation, rising economic inequality, and the federal fiscal crisis. By attending to the food system, it is possible to address these issues in a coordinated and effective way.

What went wrong

The situation we face reflects, in large part, the unintended consequences of the last fundamental shift in agriculture policies, implemented by President Nixon in the early seventies. In an effort to combat a spike in food prices, the Nixon Administration abandoned supply controls and used the policy tools at its disposal to boost farm production by subsidising, and encouraging, the industrialisation and consolidation of

commodity agriculture. This 'productivist paradigm' – heavily dependent on fossil fuel inputs and a small number of crops grown in monoculture – succeeded in producing an abundance of cheap calories. But this was achieved at a price to the health of the population, the environment and rural economy that is now intolerable.

The right road ahead

The food system resulting from these policies has created economic dependencies that complicate reform, leaving us with a set of institutions and policy vehicles that are incapable of tackling the problems of the food system – problems that go far beyond food and farming. Today, policies are needed that respond to the evolution and actual structure and function of the contemporary food system. A coherent national food policy must therefore replace obsolete conceptions, policies, tools, and institutions with new ideas and processes to address current challenges and prevent similar market failures from occurring in the future.

Public support for this bold action will come from uniting traditional constituencies in the labour, social justice, environmental, alternative energy, and public health sectors with those in the food movement. The various constituencies composing food system activism have forced Big Food and Big Ag to spend nearly $100 million since 2012 to resist calls for labelling of genetically modified products. The national food policy could be the organising principle that galvanises this nascent movement and its emerging political power. A new political constituency is forming around food issues. The old 'farm vote' will soon be overtaken by a 'good food' vote comprised not only of a new generation of young farmers, but also of the people they feed, a rapidly growing segment of the population who have begun to vote with their dollars – and their actual votes – for a healthier, less exploitative, more humane food system. Leadership and vision from the president would be commensurate with the stakes, and will provide the administration with an opportunity for executive action and historical legacy.

The United States has been the global leader in creating and establishing a large-scale and productive food system. It therefore falls to the US to continue its leadership role by rectifying the shortfalls of that system, demonstrating how to reshape it for the 21st century so that it meets its reason for being. That reason is to produce a wholesome and healthful food supply for people of all socioeconomic backgrounds, while treating humans and animals fairly and compassionately and nurturing the ecosystems on which we depend.

For the foreseeable future, food system reform initiatives will have trouble surviving in a Congress heavily influenced by agribusiness interests. Thus most of the goals set forth here can be best achieved using existing federal and executive tools, repurposing existing resources and institutions, and enforcing existing laws and regulations. The immediate objective will be to monitor and coordinate the components of the food value chain to better match the desired criteria. The executive has the authority and therefore the opportunity to oversee each link in the food chain:

Box 1

US National Food Policy actions

President Kennedy made physical education an accepted part of the school curriculum. The next president should do the same for 'edible education.' Actions should include the following:

Build gardens in schools, patterned after the White House garden and programmes such as Edible Schoolyard, which can be used to infuse food and health throughout the curriculum.

Introduce cooking lessons in schools, including cooking of vegetarian dishes, explicitly targeted to both boys and girls.

Boost the Child Nutrition Act so that school lunch spending increases by $1 a day per pupil to underwrite healthy, sustainably grown food, a sizeable portion of which should be purchased locally (a model successfully implemented by the Province of Ontario).

Rebuild cafeterias, many of which are equipped only to microwave processed food, by funding programmes to upgrade kitchens and dining areas.

Increase funding for US Department of Agriculture competitive grants targeted to build Farm to Cafeteria value chains.

Raise the eligibility threshold for free and reduced school meals to 200 percent of the poverty rate.

Other actions, outlined here with a little more detail -

Support expansion of the successful FoodCorps programme established by an AmeriCorps grant and matching philanthropic funding, to place college graduates in schools to support teachers' efforts to include food in curricula and promoting health through programmes such as school gardens and healthier cafeteria choices.

Forgive repayment of federal student loans in exchange for two years of service in the programme, and provide a path to formal institutionalisation of the programme in schools and within the US Department of Agriculture.

Support the burgeoning market for health, fairness, and sustainability through food by providing maximum transparency in food labelling. Make it simple to determine that food is healthful, fair, and sustainable through re-conceived labels conveying what we now know to be important about our food.

Enlist the advertising industry in a public service campaign to promote the consumption of vegetables in place of junk food and water in place of soda, particularly for children. Nothing would do more to reduce rates of Type 2 diabetes – and the federal spending required to treat it – than a reduction of soda consumption by children. To prevent the taste preferences of children being shaped by the advertising campaigns of food companies, tax advertising for junk food and soda and use the revenue to fund public campaigns on healthy foods.

Partner and coordinate with non-government organisations as they develop a tough food industry pledge governing marketing to children, and then through the Partnership for a Healthier America, single out for recognition those food companies that sign it.

- Production (labour and environment standards)
- Processing and distribution (antitrust and food safety)
- Retail and institutional delivery (wages and economic inequality)

Also, healthcare and public health (prevention by way of public education, medical and healthcare incentives, including appropriate incentives for healthy food, and policies ensuring availability of that food.

Bold action needed

Public support for bold executive actions will be necessary, and the mobilisation and organisation of that support will take money. But there are philanthropies that focus on food, health, and equity issues. Their funding, along with support from citizens and communities, will follow when they see a clear vision and agenda around food, such as the National Food Policy.

In many ways, the Obama family has set an example that the next presidency could expand on. It did so by establishing the first producing kitchen garden on White House grounds since the Franklin Roosevelt administration, by modelling healthful eating, and by patronising and promoting local farmers' markets. It established programmes such as Let's Move and the Partnership for a Healthier America. It promoted reforms in key social welfare programmes such as the Child Nutrition Act, it set up the Childhood Obesity Task Force, and it challenged the Grocery Manufacturers Association to produce and advertise healthful foods in pursuit of their own economic interests. It reformed the healthcare system along preventive principles through the Affordable Care Act. This platform provides a strong basis for the next president to build on the Obama administration's demonstration of the importance of food, health, equity, and sustainability. This can be accomplished through measures such as those listed in Box 1, above.

This is obviously a large undertaking, requiring political will, and also authority, coordination, and continuous monitoring. Many of the issues discussed here are now administratively intractable, because oversight of issues that need to be managed all together is distributed across various jurisdictions. Establishment of effective oversight to enable reform will mean restructuring the politics of food and agriculture. It would be foolish to underestimate the size of that task.

The US Department of Agriculture is large and saddled with disparate and often conflicting goals. It manages subsidy and trade promotion programmes that incentivise production of the industrial commodities underpinning the global junk food culture, the very culture that it theoretically opposes. It should be reconstituted as a new entity, with a name that clearly identifies what must become its foremost mission. We propose the US Department of Food, Health and Well-Being.

*Bittman M, Pollan M, Salvador V, de Schutter. US food: plan for the next President. [The Food System] World Nutrition September-October 2015, **6**, 9-10, 671-675*




WN *The Food System*

World food: power to the people

Update team note

This second *Update* on food policies in our series here is edited and abbreviated from a fully referenced recent paper in FP (Foreign Policy). It is by former UN special rapporteur Olivier de Schutter, a *WN* supporter It develops the thesis outlined in Update in June 2014

Access June 2014 Olivier de Schutter on the need for food regulation here
Access December 2014 Mark Bittman et al on US and global food policy here
Access July-August 2015 Food Policy Olivier de Schutter on world food policy here



New principles are needed now, for global food policy and action fit for these times. Olivier de Schutter (above) states that these must begin by giving power to the people who really grow the food

In the 1960s and early 1970s, world population was rapidly increasing but agricultural output was stagnant. Doomsday predictions seemed to be turning into reality. The answer, governments decided, was to produce much more food. Technological advances, and interventionist policies including subsidies to farmers, would raise outputs and drive prices down. This vision shaped the European Common Agriculture Policy. In the US it inspired a massive programme boosting grain production. In South Asia the Green Revolution boosted agricultural output through new high-yielding crop varieties, the extension of irrigated land, and massive increase in mechanisation and chemical fertilisers.

The world hunger scandal

This framing of hunger and malnutrition primarily as quantity problems inaugurated a trend that has lasted for several decades almost without interruption, driven by governments and Big Agrifood. But the absolute number of hungry people has hardly been reduced since the early 1970s, consistently oscillating around 850 million. While the proportion of undernourished people has declined – today, it's about 12 per cent of the world's population – hunger is far from eradicated. In fact, when assessed from the viewpoint of their contributions to health, poverty alleviation, and

Box 1

Food sovereignty

Big Agrifood has already been met with resistance in the form of an idea steadily gaining traction at the grassroots level: food sovereignty.

The concept emerged 20 years ago from the mobilisation of small-scale farmers, or *campesinos*, in Costa Rica, and from the protest marches of small-farm holders in the Indian state of Karnataka. The message was simple. Agricultural policies should not be held hostage to the exigencies of international trade. This idea was central to the establishment in 1993 of *La Via Campesina*, now arguably the world's largest transnational social movement, spanning 164 local and national organisations in more than 70 countries across Asia, Africa, Europe, and the Americas. It represents an estimated 200 million farmers.

The peasants are uprising

Initially rural, the movement focuses on the needs of small-scale farmers who take pride in their identity as 'peasants', in reaction to big-food geopolitics. By 1994, when the Uruguay Round of multilateral trade negotiations concluded, and at the request of major global South countries, agriculture had become crucial in the establishment of the World Trade Organization. Food was set to be grinded in the mill of commodification. Farmers the world over were pushed to compete, meaning that the least competitive would disappear.

The early food-sovereignty activists of La Via Campesina were quite prescient when it came to understanding how international trade could and would shape food systems. It standardises farmers as well as the commodities they produce, encouraging the unsustainable growth of long-distance trade controlled by the Big Agrifood behemoths, and neglecting local and regional markets. This is well attested by the farmers themselves, as a new film shows.

Resilience requires diversity, these activists campaigned, including a diversity of markets. The 2008 food price crisis showed how right they were. The dramatic spike in commodity prices hit the countries that depend the most on food imports particularly hard. It did not benefit farmers, squeezed between rising costs for inputs upstream and large buyers downstream whose power enabled them to take most money out of the food chain.

Food sovereignty has now left its rural origins and become a movement in which both consumers and producers seek to reclaim or reinvent food systems from the bottom up. Indeed, in all regions, groups of ordinary citizens are developing ways to gain autonomy and bypass the dominant industrial food systems.

Agroecology

Also, farmers increasingly are embracing agroecology. Biological control – the use of the right combination of crops on any single field – replaces the use of pesticides. Leguminous plants serve to nourish soils, reducing the need to use nitrogen-based fertilisers. Trees, that had been banished from fields in the name of maximising yields, are being planted again alongside crops; their roots allow soil to capture moisture better, and their shade reduces evaporation, making it possible to save water for irrigation. Integrated cropping and rotation allow the replenishment of soils that monocropping had been destroying over decades.

Agroecology reduces the use of external fossil fuel-based inputs, recycles waste, and combines elements of nature to maximise synergies. It treats the complexity of nature not as a liability, but as an asset. The farmer learns by trial and error, even when the ultimate 'scientific' explanation may remain elusive. Long at the receiving end of technological developments, he or she will now determine what works best in a local context.

environmental protection, the food systems inherited from the 20th century have not been a spectacular success. Rather, they have failed spectacularly.

From storage facilities to processing plants and transportation routes, infrastructures have been built in support of large-scale production. As a result, today's food systems are in the hands of huge Agrifood interests – commodity brokers, food processors, increasingly concentrated retailers and caterers – whose dominance breeds dominance. Because they have the logistics, control the networks, and capture the subsidies, they can easily crush competitors. They continue to flood markets with heavily processed foods, manufactured from the mountains of soy and corn that governmental subsidies encourage. These interconnected systems of overproduction won't feed the world. In fact, it is both what ails humankind and what starves it.

Moving to food sovereignty

Over the past two decades, food sovereignty movements have tirelessly pushed governments and corporations to put the power of production and distribution back into the hands of local farming communities. But the world's food systems are still dominated by international trade. Two years after the 2008 crisis, food prices rose again almost as dramatically as they had fallen

Let's not lie to ourselves. Well-documented threats such as peak oil, genetic erosion from monocropping schemes, soil degradation, and climate change, will mean a future with more volatility and the need to quickly invent more solutions to food problems. Location-specific innovation is the best way to build that resilience. An increasingly interdependent world requires creating alliances at the national and international levels to support local markets and system. Environmental groups can team with parents' organisations. Politicians of all stripes concerned about public deficits could join forces with health-care practitioners to address the mounting costs of treating diet-related illnesses. Activist groups should discover that their concerns about the impact of subsidies, which result in dumping on local markets in the global south, are echoed by taxpayer's associations.

The more I have worked with governments operating from the top down, the more I have come to believe in the strength of social movements to make change happen from the bottom up. Solutions that can be designed using local resources are less vulnerable to outside market or energy shocks. The more diverse these solutions, the better local systems will be equipped to deal with contingencies.

Is this revolutionary? In a peaceful sense, yes it is. Changing society without seizing power is what food sovereignty movements are about. The revolution they propose is a silent one. It is gradual. But it is already happening all around us, proposing an alternative to low-cost, Big Food systems with which we've been burdened for far too long.

de Schutter O. US food: power to the people
*[The Food System] World Nutrition September-October 2015, **6**, 9-10, 676-678*



WN *Development*

Visions for this century (8)

Access November 2014 Visions for this century (1) here
Access December 2014 Visions for this century (2) here
Access January-February 2015 Visions for this century (3) here
Access March 2015 Visions for this century (4) here
Access April 2015 Visions for this century (5) here
Access May 2015 Visions for this century (6) here
Access June 2015 Visions for this century (7) here
Access July-August 2015 Visions for this century here

Brooke Aksnes writes:

In Visions – access them above – *WN* editorial team and family members have assessed the state of the world now, and their visions for the future. We will continue to publish *Visions* as *Updates* and as letters in our *Feedback* section.

Pilar Zazueta





Food waste must stop. The cornucopia of non-seasonal produce as well as ultra-processed products on sale in supermarkets is simply a falsely-reassuring mirage of infinite production in a finite world

What mainly determines population well-being, health, and disease?

I do not think that the question has a definitive answer, but we still can discuss together if some explanations have more merit than others, and why. Considering the problem from a long-term historical perspective, to me the factor that mainly determines well-being, health and disease outcomes is power.

Some human groups have achieved better living standards than others. They have more economic resources, live longer, eat better, and have more leisure time and less stress. Today, these groups also tend to live in the global North 'liberal democracies'. The reality is that this progress, or economic development, has been achieved in most cases through the exploitation of other human groups across the globe.

The worst health and well-being outcomes have been and continue to be observed in colonised societies, or in places that have been ravaged by war. In both of these situations, the majority of people are excluded from participating in politics, or in making decisions on how to run their societies. Poverty is now the main cause of political disenfranchisement.

What mainly determines good population nutritional status?

The easiest answer to this question is access to economic resources and knowledge. Wealthier and more educated people, personally and as family members, in most societies tend to eat better. But there are two other things that I also consider very important: time and space.

Getting and preparing food – especially when the goal is to have a varied diet and consume lots of fresh produce – requires a lot of time and effort. The entire Mesoamerican civilisation was sustained by the labour of women who spent most of their time grinding corn and preparing tortillas. In modern societies even people who have a stable well-paying job are struggling to find the time in which to cook a decent meal.

Now, imagine a person who works three shifts at a fast food restaurant. Even if this person can afford the ingredients for a decent meal, she is probably going to be too exhausted to prepare such a meal.

Space is also a factor, particularly in urban settings, because in traditional rural societies people lived in close proximity to their food. Today urban populations have supermarkets, but in some cases, stores that sell fresh produce are geographically inaccessible.

How useful are the current nutrition sciences?

Nutritional sciences that follow the model of other natural sciences have been very successful in helping to achieve various technical goals. It is very

important to continue to innovate in those areas—we need to know more about chemistry, physics and physiology.

Now, the problem is that in a lot of cases nutritional sciences, as with other forms of medical knowledge, seem to operate in some sort of social vacuum. Few people are taking into consideration how their research or discoveries might affect communities, or what their application in the real world, beyond commercialisation, might be.

Are enough governments and official agencies making real progress?

Food and nutrition are very low on the list of priorities of most governments. In part, this might be the result of shrinking budgets and increased investment in other areas like security and policing, especially in low and middle-income counties.

There are some examples in which food equity has been included in municipal agendas particularly through participatory budgeting mechanisms, but these are isolated cases, mostly in Brazil. In the rest of Latin America for example, governments rely on social programmes, like conditional cash transfers, that try to improve health outcomes and reduce malnutrition through subsidies that encourage changes in individual behaviour.

Are current dietary guidelines and nutrition education programmes effective?

Education programmes and dietary guidelines can be effective, but their effectiveness largely depends on how they are used. In places like the United States people are starting to distrust expert knowledge, because there is a growing sense that public institutions are defending the interests of private companies and not those of consumers. Until there are initiatives to curtail conflicts of interest and promote transparency, education initiatives will fail.

What types of civil society groups are most responsive to the big issues?

The most responsive civil society groups are organisations that are able to operate autonomously from government and industry and that have mechanisms in place to ensure internal democracy and leadership accountability.

Name up to three inspiring leaders likely to be active to 2030, with reasons

Fortunately today there are many people involved in advocacy and social movements whose primary aim is to reform the food system. Some of them are well known public intellectuals in the English-speaking world, including Marion Nestle, Raj Patel and Michael Pollan. These leaders have helped the public understand why the current globalised industrial food system is environmentally unsustainable and unjust. Worker support alliances as well as unions operating at the local level are fundamental to reforming food

production systems and abolishing the most noxious elements of industrial agricultural practices.

Another important group is young food enthusiasts and innovators. One example is Carlos Yescas, who founded the Mexican Cheese Institute a few years ago. He previously worked at the UN as a migration expert, and part of his current work consists in helping create employment options while preserving community-based food traditions.

Identify up to three of your greatest fears, with reasons

I fear that governments and corporations will seriously consider products like Soylent – a nutritional food supplement developed in Silicon Valley – as viable alternatives to feed large numbers of people at times both of stability and of crisis. If a chemical concoction replaces real food, we would lose some fundamental elements of what makes us human: invention, reciprocity and joy.

Identify up to three of your greatest hopes, with reasons

My hope is that we will be able to prevent the environmental catastrophe that will ensue if we continue to burn fossil fuels at the current rate. We not only need to find alternative energy sources but fundamentally change our outlook with regards to development and consumption.

Make any other remarks as you may wish

A lot of the people who are sceptical of the concept of food security or of local food movements say that these groups are being parochial or idealising the past. We know that some traditional agricultural communities had a monotonous diet. We also know that both subsistence and industrial agriculture relied (and continue to rely) on a largely-exploitative gendered division of labour. So while some experts claim that food industrialisation, and other technical innovations that affected household work, were generally positive for women, I would say that reduced workload depends greatly on the context, and for a great majority of women it is a myth. Local food movements and efforts toward food security and equity will only be successful if we work on reframing our ideas about gender roles and justice.

Also, as some feminists have been saying for years: 'no, you cannot have it all'. We live in a plural world and we need to make tough choices. Although human invention is limitless, the resources on this earth are not. We cannot sustain the wastefulness of industrial food systems, the cornucopia of non-seasonal produce and ultra-processed products offered in upper-income stores is simply a falsely-reassuring mirage of infinite production in a finite world.

*Zazueta P. Development. Visions for this century: 8 [Update]. World Nutrition September-October 2015, **6**, 9-10, 679-682*