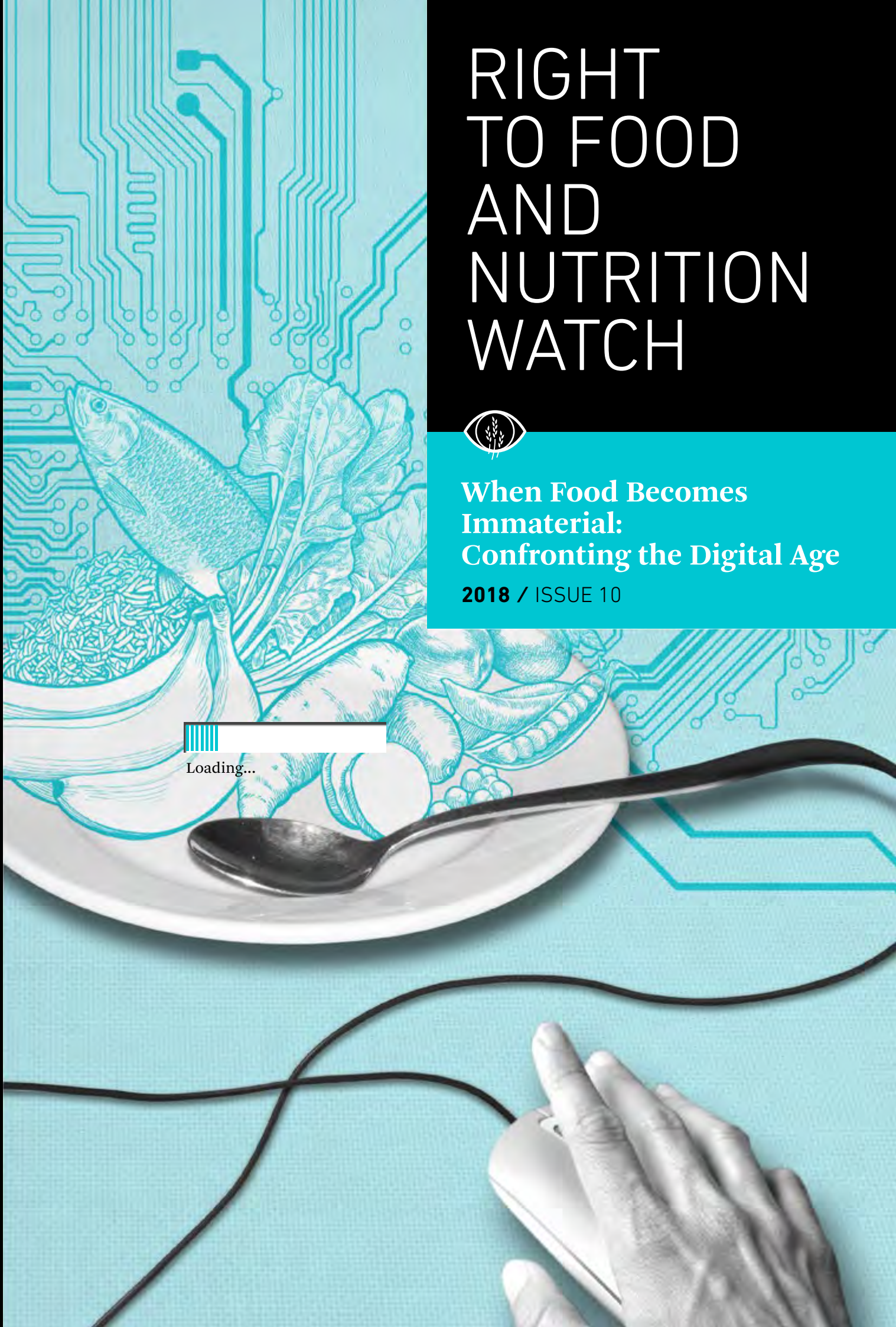
RIGHT TO FOOD AND NUTRITION WATCH



When Food Becomes Immaterial: Confronting the Digital Age

2018 / ISSUE 10

GLOBAL NETWORK FOR THE RIGHT TO FOOD AND NUTRITION

The *Right to Food and Nutrition Watch* is the flagship publication of the Global Network for the Right to Food and Nutrition, which comprises the following organizations:

African Network on the Right to Food (ANoRF/RAPDA)
Benin

Asian-Pacific Resource and Research Centre for Women (ARROW)
Malaysia

Association Paysanne pour le Développement (Peasant Association for Development, A.PA.DE)
Togo

Association pour la Protection de la Nature au Sahel (Association for the Protection of Nature, APN Sahel)
Burkina Faso

Biowatch South Africa
South Africa

Brot für Alle (Bread for All)
Switzerland

Brot für die Welt
Germany

Centro Internazionale Crocevia
Italy

CIDSE
(International Alliance of Catholic Development Agencies)
Belgium

Coletivo de Entidades Negras
(Collective of Black Organizations, CEN)
Brazil

Convergence malienne contre l'accaparement des terres (Malian Convergence against Land Grabbing, CMAT)
Mali

Dejusticia
Colombia

FIAN International
Germany

Fórum Brasileiro de Soberania e Segurança Alimentar e Nutricional (Brazilian Forum for Food Sovereignty and Food and Nutritional Security, FBSSAN)
Brazil

Habitat International Coalition-Housing and Land Rights Network (HIC-HLRN)
Egypt

HEKS/EPER (Swiss Church Aid)
Switzerland

Interchurch Organization for Development Cooperation (ICCO Cooperation)
The Netherlands

International Baby Food Action Network (IBFAN)
Switzerland

International Indian Treaty Council (IITC)
USA

International Union of Food, Agricultural, Hotel, Restaurant, Catering, Tobacco and Allied Workers' Association (IUF)
Switzerland

Maleya Foundation
Bangladesh

Observatori DESC (Observatory of Economic, Social and Cultural Rights)
Spain

Pakistan Fisherfolk Forum (PFF)
Pakistan

People's Health Movement (PHM)
South Africa

Plataforma Interamericana de Derechos Humanos, Democracia y Desarrollo (Inter-American Platform for Human Rights, Democracy and Development, PIDHDD)
Ecuador

POSCO Pratirodh Sangram Samiti (People's Movement Against POSCO, PPSS)
India

Rede da Sociedade Civil para a Segurança Alimentar e Nutricional na Comunidade de Países da Língua Portuguesa (Regional Civil Society Network for Food and Nutrition Security in the Community of Portuguese-Speaking Countries, REDSAN-CPLP)
Portugal

Réseau des organisations paysannes et de producteurs agricoles de l'Afrique de l'Ouest (West African Network of Peasant Organizations and Agricultural Producers, ROPPA)
Burkina Faso

Right to Food Campaign
India

Society for International Development (SID)
Italy

Terra Nuova - Centro per lo Volontariato ONLUS (TN)
Italy

URGENCI
France

WhyHunger
USA

World Alliance for Breastfeeding Action (WABA)
Malaysia

World Alliance of Mobile Indigenous Peoples (WAMIP)
India

World Council of Churches – Ecumenical Advocacy Alliance (WCC-EAA)
Switzerland

World Forum of Fish Harvesters and Fish Workers (WFF)
Uganda

World Forum of Fisher Peoples (WFFP)
South Africa

World Organization Against Torture (OMCT)
Switzerland

WUNRN (Women's UN Report Network)
USA

PUBLISHERS

Brot für die Welt
Germany

FIAN International
Germany

FINANCED BY

Brot für die Welt

European Commission (EC)

FIAN International

HEKS/EPER (Swiss Church Aid)

MISEREOR

Swiss Agency for Development and Cooperation (SDC)

This publication has been produced with financial support from the European Commission (EC). The contents of this publication are the sole responsibility of the authors and can in no way be taken to reflect the views of the EC.

| Editor in Chief
M. Alejandra Morena,
FIAN International – *morena@fian.org*

| Editing and Proofreading Katie Anne Whiddon
| Translation from Spanish and French into English Katie Anne Whiddon
| Art Concept & Design Ian Davidson, Marcela Vidal
| Print LokayDRUCK, Germany, on FSC-certified paper
| Cover Artwork inspired by Pawel Kuczynski. Photo by Alex del Rey. Illustration by Álvaro López.

SEPTEMBER 2018

Follow us on Facebook:
www.facebook.com/RtFNWatch

Follow the latest developments via Twitter:
#RtFNWatch

ISBN:
978-3-943202-45-8

www.righttofoodandnutrition.org/watch

CONTENTS

ACRONYMS & ABBREVIATIONS

4IR	Fourth Industrial Revolution
B&M	brick and mortar
CBD	Convention on Biological Diversity
CFS	UN Committee on World Food Security
CSM	Civil Society Mechanism for relations to the UN Committee on World Food Security
CSO	civil society organization
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GoI	Government of India
GPS	Global Positioning System
IPC	International Planning Committee for Food Sovereignty
ISDS	Investor-state dispute settlement
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture
MATOPIBA	Maranhão, Tocantins, Piauí, Bahia (4 states that make up a region in Brazil)
MGV	Monsanto Growth Ventures
NGO	non-governmental organization
PDS	Public Distribution System
STI Forum	UN Forum on Science, Technology and Innovation
TNC	transnational corporation
UN	United Nations
WEF	World Economic Forum

01

RECLAIMING THE FUTURE OF FOOD: CHALLENGING THE DEMATERIALIZATION OF FOOD SYSTEMS

Marcos Ezequiel Filardi and Stefano Prato

Marcos Ezequiel Filardi is a lawyer who specializes in human rights and food sovereignty. He lectures at the School of Nutrition of the University of Buenos Aires (UBA), where he holds the Chair on Food Sovereignty, which is an academic space that promotes public debate on food systems.

Stefano Prato is Managing Director at the Society for International Development (SID) and Editor of SID's quarterly Journal, *Development*. He is a member of the Editorial Board of the *Right to Food and Nutrition Watch*.

Society for International Development (SID) is an international network of individuals and organizations founded in 1957 to promote social justice and foster democratic participation in processes of development.

"These dynamics, namely processes of dematerialization, digitalization and financialization, are deeply changing the character of the corporate food system. The result of this includes the shifting of power to new actors who are often increasingly distant from food production. At the same time, they are altering the conception of the food market and food consumption habits within urban centers and beyond."

ACKNOWLEDGMENTS |

Special thanks to Silvia Ribeiro (ETC Group), Adriana Contarini and Guillermo Hough (Chair on Food Sovereignty *9 de Julio* and ConCiencia Agroecologica), Guillermo Torres (independent researcher) and Sofía Monsalve (FIAN International) for their support in drafting and reviewing this article.

In 1966, Harry Harrison published a book entitled "Make Room! Make Room!", in which he imagined a city of the future where water was drastically rationed, and a single corporation distributed the only edible product called 'Soylent', an industrial produced cookie composed of soy and lentils, whilst only the opulent minority could afford the luxury of meat and vegetables. The publication contained the following dedication: "For your sake, my children, I hope this turns out to be just a work of fiction."[1]

How far are we from Harry Harrison's fiction today? This year's *Watch* explores the impact that some of the dominant versions of modernity's key dynamics have on food systems. These dynamics, namely processes of dematerialization, digitalization and financialization, are deeply changing the character of the corporate food system. The result of this includes the shifting of power to new actors who are often increasingly distant from food production. At the same time, they are altering the conception of the food market and food consumption habits within urban centers and beyond. From the perspective of peasants and their communities, it is essential to understand these dynamics and analyze how they might be shifting the targets of political action in the pursuit of food sovereignty and the fulfillment of the human right to adequate food and nutrition.

Over the past decades, the combined effect of liberalization, deregulation and privatization has seen the range of tradable goods and services expanding and extending into domains that have previously been considered inherently public, such as

1 Harrison, Harry. *Make Room, Make Room!* New York: Doubleday Editions, 1966. The book inspired the script of the movie *Soylent Green*, United States, 1973.

water, education and health, among others. This transformation of public goods, the cornerstone of human rights, into tradable commodities is referred to as "commoditization" or "commodification". Not only has the private provision of public goods under the neo-liberal doctrine of global economic institutions increasingly become the norm, but also, such provision has increasingly been de-regulated to the point of fundamentally altering the nature of the goods being provided. While it is largely accepted that food is a tradable good (food has been traded as a commodity for centuries), it is the failure in regulating markets, under the impulse of free market orthodoxies, that promotes the full commodification of food and contributes to the strategies of dispossession of productive resources that have heavily affected peasant communities. Such a weak market regulatory framework has generated a huge gap between what is legal and what is sustainable, coherent with human rights, and morally acceptable.

Under these same drivers, neoliberalism has generated an unprecedented concentration of wealth. Since 2015, the richest 1% of the world population has more wealth than the rest of the people on the planet; eight men possess the same wealth as 3,600 million people (half of humanity). Over the next 20 years, 500 people will bequeath US $ 2.1 trillion to their heirs, a sum that exceeds India's GDP, a country with a population of 1.3 billion people. The income of the poorest 10% of the world population has increased less than US $3 per year between 1988 and 2011, while those of the richest 1% have increased 182 times more.[2] As a result, we are witnessing an almost total control of the industrial food system by fewer and fewer people and corporations,[3] as also elucidated by Trudi Zundel and Silvia Ribeiro in their article on the process of mega-mergers in agricultural inputs and machinery.[4] At the same time, the Peasant Food Web provides, to this day, 70% of our food using only 25% of our common goods.[5]

DEMATERIALIZATION, DIGITALIZATION AND FINANCIALIZATION: INTERTWINED YET DIFFERENT CONCEPTS

Three intertwined dynamics – dematerialization, digitalization and financialization – are profoundly changing the nature of both tradable goods and the markets where these are exchanged. While each of these dynamics may be subject to different characterizations, the objective of the *Watch* is to frame popular definitions that can support policy engagement and political action by rights-holders and their social organizations. While these dynamics apply to all of the different dimensions that make up the food systems (including genetic resources, land, etc.), we have chosen to use the generic term of food to exemplify their significance.

By **dematerialization of food** we refer to a process that promotes the decrease of the physical substance of food and the increase of the market value of its immaterial dimensions. This happens at two levels. The first one relates to the value share of physical substance within the composition of food price. Traditionally, this was influenced by the significant farm-to-retail price spreads, meaning the difference between retail prices and producer prices of a given food product, generated by the material and immaterial costs that contribute to defining the price of food (including transport, logistics and distribution costs). Increasingly the share of immaterial dimensions is becoming larger than the actual value of food, from the cost of advertising, financial remunerations to investors, skyrocketing profits of large distribution channels and sophisticated attempts to use food purchases to gather information on consumers. The second dimension of dematerialization is related to fashion and taste, where aggressive marketing and new fashionable eating habits

2 Oxfam. *An Economy for the 99%*. 2017. P. 2. Available at: www.oxfam.org/economy-99.

3 For more information, please see: International Panel of Experts on Sustainable Food Systems (Ipes Food). *Too big to feed: Exploring the impacts of mega-mergers, concentration, concentration of power in the agri-food sector*. 2017. Available at: www.ipes-food.org/Concentration; Heinrich Böll Foundation, Rosa Luxemburg Foundation, Friends of the Earth Europe. *Agrifood Atlas, Facts and figures about the corporations that control what we eat 2017*. October 2017. Available at: www.boell.de/en/agrifood-atlas.

4 *Ibid.* For more information on the process of mega-mergers in agricultural inputs and machinery, please see "Let Them Eat Data" in this edition of the *Right to Food and Nutrition Watch*.

5 ETC. *Who will feed us? The Peasant Food Web vs. The Industrial Food Chain*. 2017. Available at: www.etcgroup.org/whowillfeedus.

are generating an immaterial notion of food that is often unrelated to its physical qualities. This means that we can buy egg-like-products that do not actually contain eggs. Some of these trends are sometimes promoted by ill-framed health concerns, whereby the focus, even assuming the health concern is legitimate, is placed on retaining the consumption of an artificially reproduced taste rather than promoting healthy and sustainable diets. Some might argue that food always included immaterial dimensions, such as identities, cultures and traditions as well as, more broadly the joy of consuming a delicious meal. The difference here is the emerging shift from these socio-cultural, and somehow public, immaterial dimensions of food to market-valued, and therefore inherently private and tradable value-chain components (information on consumer choices, advertising, financial remunerations to brokers and retailers). The paradox of all this is to have food in the markets whose acceptability and price are fundamentally de-linked from physical production, and where taste mimics something that in fact might not even be there.

By **digitalization of food** we refer to an increasingly automated, delocalized and informatized process of production and commercialization of food. This starts at the level of agricultural inputs, with the ongoing efforts to advance bioinformatics infrastructures that are transforming seeds and other plant genetic material into digitalized sets of information. Paradoxically, while this process might have been initiated by scientists genuinely concerned with safeguarding biodiversity by creating virtual genetic material, which might be transplanted to future territories, it has now been captured by ruthless global corporations aiming to patent nature and acquire control of the production process by controlling the market of agricultural inputs. This means that plant and breed varieties are now circulating around the globe in the form of (patented) genetic data while the physical exchange of real seeds by farmers is made illegal in some countries. At production level, advancements in automation and robotics, drone technologies and remote controlling, have all rendered possible the extreme de-localization of automated agricultural activities, for example through remote-controlled robotic solutions to greenhouse automations. Lastly, e-commerce and service-related apps for mobile devices are reshaping the retail and food service industry by allowing 'customers' to place online orders with physical groceries, online retailers and restaurants for home delivery. New applications are beginning to flourish that enable customers to scan the barcode of the product that they wish to reorder, to place orders through microphones embedded in their mobile phones, or the ability to simply click the button on small devices associated with specific food products. In some cases manufacturers have also embedded purchasing apps and buttons into the hardware of kitchen appliances so that products can seamlessly be delivered to their doors. The concept of the marketplace as a physical location where people gather for the sale and purchase of goods, with all its colors, traditions, forms of knowledge, negotiations and transactions, is increasingly viewed by today's homogenizing modernity as reminiscent of an archaic past. As one example, in this edition of the *Watch*, the article by Shalmali Guttal explores the challenge posed by Amazon in reshaping India´s food retail.[6]

By **financialization of food** we refer to the increasing role played by financial markets within food systems. This plays out at two main levels. The first is the significant growth in the sale and purchase of financial products linked to food commodities, with the consequence of agricultural commodity futures markets replacing real economy determinants as the main drivers of food prices and their volatility. The second one is related to the transformation of agricultural resources. This is mostly related to land, but evermore so to information on genetic data, as well as on

6 For more information on this challenge, please see "The Changing Face of Food Retail in India" in this edition of the *Right to Food and Nutrition Watch.*

patents over genetic resources, and infrastructures, which can be turned into financial assets for the purpose of acquisitions and re-sales in financial centers. These transactions are often completely delocalized from their physical locations and are completely independent of their actual use. Indeed, the financialization process of land facilitates land grabbing by (foreign) investors in manners that are often completely independent from agricultural production, as seen in the case study on MATOPIBA, Brazil, in this edition of the *Watch*.[7] These intertwined dynamics have shifted decision-making power away from physical production systems in favor of often-unknown financial actors that are primarily interested in upstream operations rather than actual agricultural activities. As a result, global financial actors investing in land seek to speculate and maximize their financial gains, as opposed to peasants seeking to maintain their control over land to grow food, sustain their livelihoods and protect their cultural heritage. Financialization, therefore, has promoted grabbing of resources, production up-scaling, increasing delocalization of production from distribution and marketing, and the growth of intermediaries as the key point of aggregation in the food chain. Not only has this increased the distance between producers and consumers and facilitated the dispossession of land and other resources by their legitimate communities, but it has also undermined, if not emptied, local and national public spaces from effective decision-making power. These vicious processes have been largely facilitated by market liberalization measures promoted by global financial institutions in collusion with dominant local elites, promoting the emergence of normative hierarchies between commercially-framed rights, including investors' rights, and human rights. A perfect example can be seen in the numerous investor-state dispute settlement (ISDS) mechanisms embedded into bilateral and plurilateral trade agreements that *de-facto* limit states' capacity to regulate in the public interest and comply with their duty-bearer obligations to respect, protect and fulfill human rights.

7 For more information on this case study on financialization and land grabbing, please see "When Land Becomes a Global Financial Asset: The MATOPIBA Case in Brazil" in this edition of the *Right to Food and Nutrition Watch.*

While these definitions aim to bring some clarity in distinguishing between dematerialization, digitalization and financialization, it must be noted that the boundaries between these processes are often blurred and they should rather be regarded as different facets of the same macro phenomenon, which some have actually termed 'dematerialization' in the broader sense. Indeed, social movements have often used such broader meaning of dematerialization to qualify some of their struggles, as in the case of the fights against the dematerialization of land, seeds and genetic resources. This may also have been facilitated by the reality that some resources, such as land or seeds, could be impacted by all three of these dynamics. However, it remains important to draw some differences between these three processes in order to increase our analytical capacity and be able to better target normative interventions. At the same time, it must be noted that these dynamics are closely intertwined: in this year's *Watch*, Philip Seufert, Maria Luisa Mendonça and Fabio Pitta elaborate on the role digitalization has played in transforming land into a financial asset, while Trudi Zundel and Silvia Ribeiro describe how agricultural inputs, machinery and data are being merged into one another.

BEYOND DIGITALIZATION: THE FOURTH INDUSTRIAL REVOLUTION

In January of this year, the same actors that until now have promoted, financed and benefited from what they called the 'Green Revolution' (the multinational companies grouped in the World Economic Forum (WEF) and the Rockefeller Foundation, among others) published a report where they recognize the failure of the agro-industrial system that they shaped by force of their growing power.[8]

8 World Economic Forum. *Innovation with a Purpose: The role of technology innovation in accelerating food systems Transformation.* 2018. Available at: www.weforum.org/Innovation_with_a_Purpose.

9 For more information on this process, please see article "Let Them Eat Data" in this edition of the *Right to Food and Nutrition Watch.*

This would certainly be news to celebrate – if only it came with the fair recognition of the struggle of social movements and peasants who denounce and resist the devastating consequences in their territories. Unfortunately, the very same actors who produce such reports claim to have their own recipe to find the way out of the food system crisis: the "Fourth Industrial Revolution (4IR), characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres."[9] Trudi Zundel and Silvia Ribeiro describe what 4IR looks like in the case of precision agriculture and explore its implications for peasants. The new package promises to transform food systems with the following "12 transforming technologies":

- alternative proteins;[10]
- sensors with infrared spectrometers and hyperspectral images to analyze the "safety, quality and traceability of food"[11];
- nutrigenetics for personalized nutrition[12];
- distribution of services to peasants through mobile phones;[13]
- big data and advanced analytics for insurances;[14]
- Internet of things for transparency and real-time traceability of the food chain;[15]
- traceability through Blockchain;[16]
- precision agriculture to "optimize the use of agricultural inputs and water",[17] based on big data;[18]
- genetic editing[19];
- microbiome technologies to increase crop resilience;[20]
- biological products for the protection of crops and soil enrichment;[21]
- and renewable energies.[22]

We could also add other developments in progress, such as CRISPR technology,[23] Genetic Biocontrol on Invasive Rodents (GBIRD),[24] genetic drivers,[25] algorithms overloaded with racial, sexist and colonial prejudices,[26] synthetic biology, nanotechnology and 3D food printing, among others, to challenge the most imaginative work of fiction.

If the Green Revolution found its legitimizing mantra in the need to increase production to 'feed the world', the Fourth Industrial Revolution, conscious of the failure of the previous one, now uses as a hook the need to build 'inclusive and sustainable food systems based on new technologies', presenting a new narrative with some new key actors and, therefore, posing new challenges.

WHAT ARE THE IMPACTS ON THE RIGHT TO FOOD AND NUTRITION AND THE STRUGGLE FOR FOOD SOVEREIGNTY?

Definitions aside, the combined effect of these dynamics – dematerialization, digitalization and financialization – is extremely concerning from the point of view of all those struggling to reaffirm the human right to adequate food and nutrition, in the context of the indivisibility of all human rights, as the cornerstone of the paradigm shift that should place agroecology at the core of our societies and our food systems. Not only do these processes contribute to the dispossession of peasants' knowledge and access to resources, by widening the gap between producers and consumers, they also facilitate the concentration of economic and political power into the hands of new set of remote actors that master information and financial means. This reframes class struggles, veering away from the traditional tension between labor and the ownership of physical capital, because the new masters of extreme inequalities do not engage in the real economy but rather in the immate-

10 For more information, please visit: protix.eu/; https://www.ipiff.org/; http://www.buhlergroup.com/insect-technology-solutions y www.impossiblefoods.com/.

11 For more information, please visit: www.impactvi.com/.

12 For more information, please visit: habit.com. For more information on the implications of 'personalization' for society, please see "Digitalized Nutrition or Personalized Malnutrition?" in this edition of the Right to Food and Nutrition Watch.

13 For more information, please visit: rmlagtech.com/.

14 For more information, please visit: ewn.co.za/Topic/Mobbissurance.

15 For more information, please visit: www.verigo.io/.

16 For more information, please visit: www.forbes.com/ibm-walmart-launching-blockchain-food-safety-alliance-in-china.

17 For more information, please see: www.farmersedge.ca.

18 For more information on big data, please see "Let Them Eat Data" in this edition of the *Right to Food and Nutrition Watch.*

19 For more information, please visit: cariboubio.com.

20 For more information, please visit: www.indigoag.com.

21 For more information, please visit: www.agbitech.com.

22 For more information, please visit: www.ecozensolutions.com.

23 Ribeiro, Silvia. "Monsanto, Dupont, CRISPR ¿qué puede salir mal?" *La Jornada*, October 1, 2016. Available in Spanish at: www.jornada.unam.mx.

24 Ribeiro, Silvia. "Armas Transgénicas para extinguir especies". *La Jornada*, September 3, 2016. Available in Spanish at: www.jornada.unam.mx.

25 Ribeiro, Silvia. "Reacción Mutagénica en Cadena". La Jornada, June 11, 2016. Available at: www.jornada.unam.mx; Ribeiro, Silvia. "Ejército de Estados Unidos, Gates y Monsanto detrás de transgénicos para extinguir especies". *La Jornada*, December 9, 2017. Available at: www.jornada.unam.mx.

26 El País. "Si está en la cocina es una mujer: cómo los algoritmos refuerzan los prejuicios". *El país*, September 22, 2017. Available in Spanish at: capitanswing.com.

rial realm of finance and information. As several commentators pointed out: "The world's largest taxi firm, Uber, owns no cars. The world's most popular media company, Facebook, creates no content. The world's most valuable retailer, Alibaba, carries no stock. And the world's largest accommodation provider, Airbnb, owns no property".[27]

27 For more information, please see: McRae, Hamish. "Facebook, Airbnb, Uber and the Unstoppable Rise of the Content Non-Generators". *Independent*, May 5, 2015. Available at: www.independent.co.uk.

Operating within the immaterial world, these actors tend to escape the boundaries of the physical and territorial notion of the Nation State and completely by-pass democratic accountability. More than this, such concentration of economic power fuels complex and far-reaching political economies that are increasingly capturing the ethical, normative and fiscal domains of the State and eroding the nature and scope of public policy spaces, particularly those where the State as duty-bearer engages with legitimate rights-holders. Of course, there are virtuous attempts to use new digital technologies for good causes that can advance peoples' struggles. In this respect, in their article in this year's *Watch*, Alvarez and Romero mention the example of EHNE Bizkaia, a member of La Vía Campesina, which developed a Smartphone application that elucidates, through a series of indicators, the repercussions of different food purchases on the environment. Seufert, Mendonça and Pitta report on how rural communities and their organizations in different parts of the world have been using tools like digital satellite images to defend their territories and better monitor the impacts of the operations of land grabbers, for instance with regards to the destruction of forests. An exemplary case is that of the Guajajara Indigenous women who use drones as part of their strategy to protect their territories. But the fundamental power dynamics are so uneven that it is hard to imagine ways to make the equation work in favor of human rights and people-centered development strategies.

This cul-de-sac imposes a reflection on science and its accountability to peoples and their communities. Far too often, benign research promoted in the name of noble goals has been turned against the people it was aiming to serve and has now become the instrument of dispossession and accumulation. On many other occasions, new scientific breakthroughs have involved spill over effects into unexpected domains, with vicious applications possibly undermining the pursuit of public goals. Some would resist any attempt to limit scientific explorations in the belief that the search of the unknown is implicitly embodied in human nature. However, applying the rule of thumb – rather than sophisticated but often biased statistical calculations – may suggest that technology contributed to widening inequalities more than it bridged them, considering how dysfunctional our economies and societies have become. It is therefore imperative to question the current paradigm of research and place science at the service of our human, social and ecological challenges. This requires much more extensive *ex-ante* assessment of which research needs to be undertaken and how to ensure that knowledge remains a public good rather than a source of citizens' manipulation and dispossession. It also means finding new ways to subject the direction of future research to public scrutiny and democratic accountability. In this respect, Zundel and Ribeiro mention that the newly-formed UN Forum on Science, Technology and Innovation (STI Forum) and the related Technology Facilitation Mechanism have seen debate on the need for the UN to address corporate concentration and technology monopoly. Unfortunately, the 2017 session of STI Forum for the Sustainable Development Goals uncritically endorsed the 4IR/WEF agenda.

Food and the means necessary to obtain it are controlled and viewed as mere commodities by a select few of very powerful private actors within the capitalist economy. The exercise of the human right to adequate food and nutrition and peoples' food sovereignty may be impossible to achieve, unless citizens of the world can imagine, build and fight collectively. In order to succeed they will need to organize and fight from the bottom up, weaving networks from the vast majorities, and incorporating new actors into the struggle (such as those who denounce the impacts of information technologies on human rights). Together they will need to nurture and accumulate popular power, finding alternative ways of living – an alternative society, economy, and food system – which are effectively oriented to guarantee 'healthy, safe and sovereign' food for all and challenging the current multinational capitalist model of more and more money for less.

Soylent or no Soylent? That is the question.

IN BRIEF

The article describes the complex ways in which the intertwined dynamics of dematerialization, digitalization and financialization are profoundly reshaping our food systems.

It explores the new and serious impacts that these dynamics and the technologies promoted by the so-called Fourth Industrial Revolution will have on the human right to adequate food and nutrition and food sovereignty.

Lastly, it invites a critical discussion over the new challenges that peasants and social movements will have to face to defend and uphold their rights.

KEY CONCEPTS

→ Dematerialization, digitalization and financialization are increasing trends that are profoundly reshaping food systems.

→ The actors that promoted the Green Revolution now recognize its failure but claim to have found the way out: the so-called Fourth Industrial Revolution.

→ The technologies promoted by the so-called Fourth Industrial Revolution will have new impacts on the human right to adequate food and nutrition and on food sovereignty.

→ Peasants and social movements will need to shape new alliances in order to defend their rights.

KEY WORDS

→ Dematerialization, digitalization and financialization
→ Fourth Industrial Revolution
→ Right to food and nutrition
→ Food sovereignty

02

THE DE-MATERIALIZATION OF PLANT GENETIC RESOURCES: A PEASANT'S PERSPECTIVE

Alimata Traoré

Alimata Traoré is the Chair of the Convergence des Femmes Rurales pour la Souveraineté Alimentaire (Convergence of Rural Women for Food Sovereignty, COFERSA). She is also a member of the Coordination Nationale des Organisations Paysannes (National Coordination of Peasants' Organizations, CNOP) in Mali, which is part of the Comité Ouest-Africain pour les Semences Paysannes (West African Committee for Peasant Seeds, COASP) and of the Agricultural Biodiversity Group of the International Planning Committee for Food Sovereignty (IPC).

COFERSA is based in Sikasso, in Mali. It brings together 36 rural women's cooperatives and works to increase the economic power and the social and political status of its members, spread across six regions of Mali.

"It is by allowing biodiversity to live to its fullest potential in our fields, on our land, and on our plates that we can defeat the appropriation of our seeds, plants, animals and knowledge by a handful of persons with vested interests."

ACKNOWLEDGEMENTS |

Special thanks to Karine Peschard (Graduate Institute of International and Development Studies, Geneva), Guy Kastler (La Via Campesina and IPC Working Group on Agricultural Biodiversity), and Philip Seufert (FIAN International) for their support in drafting and reviewing this article.

WHAT IS AT STAKE?[1]

Over the last twenty years, new techniques have allowed public and private actors to sequence genomes of living organisms at an increasingly faster pace, to amass peasants' knowledge on their traits, and then to digitalize and store this 'information' in huge electronic databases.[2] This information is becoming 'dematerialized' as it is made accessible, and separated from the microorganisms, plants and animals that they stem from, and indeed they are further isolated away from the persons who provided all related knowledge. More recently, various Public-Private Partnerships (such as DivSeek) have stated that their aim is to connect and share existing databases.[3]

The *Convention on Biological Diversity* (CBD), the *Nagoya Protocol*, and the *International Treaty on Plant Genetic Resources for Food and Agriculture* (ITPGRFA) set out international obligations on free, prior and informed consent regarding access to genetic resources and related knowledge, as well as on benefit sharing from their usage. These agreements complement and consolidate the international human rights framework, especially in terms of the human right to adequate food and nutrition, which can only be realized if food producers have access to genetic resources and their utilization.[4]

Yet, the dematerialization of genetic resources risks rendering these agreements obsolete. Corporations promote an interpretation that guarantees that this 'information' remain freely accessible, and not be covered in these agreements on the same terms as physical genetic resources and related 'traditional' knowledge. This does not stop corporations from 're-materializing' this information, and using it to

1 This introduction was written by Karine Peschard, researcher at the Albert Hirschman Centre on Democracy at the Graduate Institute of International and Development Studies, Geneva.

2 At the international level, the agreed-upon terminology provisionally uses the expression "digital sequence information" (DSI). This expression reflects a scientistic and reductionist vision that is not appropriate because genetic information does not only include genetic or epigenetic data but also their direct relationship with an organism's particular traits. This link can be patented as long as it is new, and can result in exploitation by specific industries. Indeed, a vast array of information has been compiled without taking into account the possible links to genetic sequencing itself, notably

modify the genes of living organisms. If these databases were to escape all control, biopiracy would proliferate, as companies would be able to use them as a means to identify links between genetic sequencing and specific traits. They could then patent this 'genetic information' without any authorization from peasant and traditional communities. Furthermore, they could do this without sharing the benefits with those very communities who developed and preserved these resources and knowledge. Industry could then extend this patent protection to all physical organisms (plants, animals, micro-organisms) that contain this 'genetic information' and corresponding traits, including those provided by peasants and traditional communities, who would subsequently lose the right to use them freely. In sum, the dematerialization of plants and genetic resources is employed so as to facilitate patenting of living organisms, and the grabbing of genetic resources by industry.

Nevertheless, as we can see in the following sub-section of this article, written by Alimata Traoré, Chair of COFERSA, peasant movements shall not be fooled, as they closely follow these debates.

"WHAT IF THERE WERE A POWER CUT AFTER PUTTING EVERYTHING INTO A COMPUTER, WHAT THEN?"

This quote was a reflection shared by peasants from the African continent who attended the negotiations during the Seventh Session of the Governing Body (GB7) of the ITPGRFA, which took place in Kigali, Rwanda, in October 2017. Further, this is how the women from my organization, COFERSA, reacted when I explained to them what the Governing Body meeting was like, and more precisely, the global information system (also known as 'dematerialization'): "For peasant women, seeds are life. If you are not independent in terms of seeds, you become a slave to others. Women can only recognize seeds in the fields, or in storage pots, not on computers." We cannot deny that peasants' rights were also on the agenda, but what will remain of these rights if the privatization of living beings is disproportionally authorized?

Our peasant seeds, and those of our parents, have been collected without us even really knowing by whom, and for what end. Today, we are told that those who know how to use computers can become the owners of the traits that these seeds contain, and ban us from using them. My community knows how to select a sorghum variety that is sufficiently resistant to drought if sown using a farming technique called *zai*.[5] And now, a person or a corporation – whose interest is not our food sovereignty – can become the owner just because they speak the right digital language? We do not agree. This is why we associate ourselves to umbrella organizations such as the International Planning Committee for Food Sovereignty (IPC), with the goal of defending our rights to our peasant seeds and knowledge.

In Mali, we are participating in a process entitled Seeds, Norms and Peasants (SNP) that aims to gain recognition of peasant seed systems in national policies, including our knowledge of plants and animals. We still do not know if we can win, but the main thing is that our peasant seeds be sown and consumed. In our view, peasant seeds are closely tied to healthy food and nutrition.

It is for these reasons that we have stated, in the recommendations drafted at the GB7, that our varieties shall not be made available to the multilateral system as long as we do not have clear guarantees that ensure the ban on intellectual property rights (notably, patents on native traits), and all other rights (for example, commercial brands), which may restrict our rights to continue using, exchanging and sell-

the information stemming from peasants' knowledge. For more information, please see: CBD. "Digital Sequence Information on Genetic Resources" CBD/SBSTTA/22/2. March 20, 2018.

3 Peschard, Karine. "Farmers' Rights to Seed: Conflicts in International Legal Regimes". *Right to Food and Nutrition Watch* (2016): 22–23. Available at: www.righttofoodandnutrition.org.

4 Monsalve Suárez, Sofía, Maryam Rahmanian and Antonio Onorati, "Seeds and Agricultural Biodiversity: The Neglected Backbone of the Right to Food and Nutrition". *Right to Food and Nutrition Watch* (2016): 19-23. Available at: www.righttofoodandnutrition.org.

5 *Zaï* is a West African traditional farming technique whereby pits are dug into micro-basins using a pick-axe with a small handle (known as *daba*), and then the seeds are sown. This particular type of cultivating allows for the concentration of water and manure in arid and semi-arid zones.

ing seeds, plants and harvests that stem from our varieties (i.e. what they call 'plant genetic resources').[6]

Since time immemorial, our peasant communities have exchanged and circulated peasant seeds. Today, we are asked to integrate into a bureaucratic system that we do not identify with. Our major concern is to feed our communities and our children with wholesome food, not to 'commodify' our seeds and our knowledge. We request that mechanisms be put in place to protect, maintain and value our biodiversity and knowledge. We demand the respect, protection and guarantee of our collective rights over our seeds and peasant knowledge.

If somebody comes to collect one of our varieties, first they would have to obtain the relevant community's free, prior and informed consent. We have our own local decision-making processes within our communities. These traditional mechanisms should be enhanced in order to guarantee the sustainable management of our peasant seeds within the current global framework, which has been designed to protect the interests of very few.

Today, we want to make a difference. We, peasant women and men, still possess relevant depths of knowledge. Thanks to the hard work of our hands, we still manage a wide variety of vegetable seeds, but also animal breeds and non-cultivated biodiversity. Rural women play an essential role in nurturing and preserving this agricultural biodiversity, which is the key to our families' healthy diet.

It is by allowing biodiversity to live to its fullest potential in our fields, on our land, and on our plates that we can defeat the appropriation of our seeds, plants, animals and knowledge by a handful of persons with vested interests.

6 For more information on civil society organizations' statement to plenary during the Seventh Session of the ITPGRFA, please see: www.ukabc.org/gb7.

IN BRIEF

Our peasant seeds, and those of our parents, have been collected without us even really knowing by whom, and for what end. Today, we are told that those who know how to use computers can become the owners of the traits that these seeds contain, and ban us from using them. My community knows how to select a sorghum variety that is sufficiently resistant to drought if sown using a farming technique called *zai.* And now, a person or a corporation – whose interest is not our food sovereignty – can become the owner just because they speak the right digital language?

We do not agree. This is why we associate ourselves to umbrella organizations such as the International Planning Committee for Food Sovereignty (IPC), with the goal of defending our rights to our peasant seeds and knowledge.

It is for these reasons that we have stated, in the recommendations drafted at the GB7, that our varieties shall not be made available to the multilateral system as long as we do not have clear guarantees that ensure the ban on intellectual property rights (notably, patents on native traits), and all other rights (for example, commercial brands), which may restrict our rights to continue using, exchanging and selling seeds, plants and harvests that stem from our varieties (i.e. what they call ‚plant genetic resources').

It is by allowing biodiversity to live to its fullest potential in our fields, on our land, and on our plates that we can defeat the appropriation of our seeds, plants, animals and knowledge by a handful of persons with vested interests.

KEY CONCEPTS

→ Over the last twenty years, new techniques have allowed public and private actors to sequence genomes of living organisms at an increasingly faster pace, to amass peasants' knowledge on their traits, and then to digitalize and store this 'information' in huge electronic databases.

→ Corporations promote an interpretation that guarantees that this 'information' remain freely accessible, and not be covered in these agreements on the same terms as physical genetic resources and related 'traditional' knowledge. This does not stop corporations from 're-materializing' this information, and using it to modify the genes of living organisms.

→ Our major concern is to feed our communities and our children with wholesome food, not to 'commodify' our seeds and our knowledge. We request that mechanisms be put in place to protect, maintain and value our biodiversity and knowledge. We demand the respect, protection and guarantee of our collective rights over our seeds and peasant knowledge.

→ If somebody comes to collect one of our varieties, first they would have to obtain the relevant community's free, prior and informed consent. We have our own local decision-making processes within our communities. These traditional mechanisms should be enhanced in order to guarantee the sustainable management of our peasant seeds within the current global framework, which has been designed to protect the interests of very few.

KEY WORDS

→ Dematerialization
→ Genetic resources
→ Peasant seeds
→ Peasant rights
→ Traditional knowledge

03

WHEN LAND BECOMES A GLOBAL FINANCIAL ASSET: THE MATOPIBA CASE IN BRAZIL

Philip Seufert, Maria Luisa Mendonça and Fabio Pitta

Philip Seufert works at FIAN's International Secretariat, with a focus on land and seeds.

Fabio Pitta is a Postdoctoral Fellow in Human Geography at the University of São Paulo and a researcher at the Network for Social Justice and Human Rights (Rede Social de Justiça e Direitos Humanos) in Brazil.

Maria Luisa Mendonça is a Visiting Scholar at the Center for Place, Culture and Politics at City University of New York and co-director of the Network for Social Justice and Human Rights in Brazil.

FIAN International is an international human rights organization that has been advocating for the realization of the human right to adequate food and nutrition for over 30 years.

The Network for Social Justice and Human Rights comprises dozens of non-governmental organizations and social movements. It seeks to respond to a demand for action and articulation around human rights violations in Brazil.

"Proponents of digitalization of land administration information and of using blockchain in land transactions emphasize the benefits of these technologies for marginalized people, because of the increased tenure security it supposedly will provide. However, the problem of land tenure insecurity of people living in poverty is less about accurate land information and much more about oppression and power inequalities. The question is, rather: who has access to and control over these technologies and for which purposes?"

ACKNOWLEDGEMENTS |
Special thanks to Tomaso Ferrando (University of Bristol and Global Legal Action Network), Priscilla Claeys (Centre for Agroecology, Water and Resilience, Coventry University and FIAN Belgium) and Sofía Monsalve (FIAN International) for their support in drafting and reviewing this article.

How can it be that finance centers in New York or Stockholm exercise control over remote lands in Northeastern Brazil? The process of transforming land into a global financial asset requires not only changes in policies and legislation, but also the use of information technologies. This article sheds light on the role of digital land information in the process of dispossessing rural communities from their land, which is subsequently put under the control of distant global finance actors. It draws on the authors' assessment of the drivers and impacts of agribusiness expansion in the Brazilian region of MATOPIBA,[1] which is part of the *Cerrado,* a biome consisting of savannahs and forests.[2] The article discusses the challenges posed by information technologies in people's struggles for their right to land and territory and concludes by identifying issues for further research.

ANOTHER BRAZILIAN ECOREGION FALLS PREY TO LAND GRABBING

The *Cerrado* is extremely rich in biodiversity of flora and fauna, and three of the region's most important aquifers can be found there. It has drawn less attention from the media than the Amazon, but it is just as vital for the country's, and planet's ecology. The northern part of the *Cerrado* is a lifeline for the communities living there.[3]

In the MATOPIBA region, the expansion of industrial agriculture monocultures and land speculation is impairing the realization of the human right to adequate food and nutrition – among other human rights – of traditional communities, including descendants of runaway slaves *(quilombolas)* and indigenous peoples. Extensive research by civil society organizations (CSOs) shows that local people face the consequences of deforestation, widespread contamination of soil, water, and livestock by

1 MATOPIBA is the acronym for a land area of 73.173.485 hectares (h) expanding across the Brazilian States of Maranhão, Tocantins, Piauí, and Bahia, located in the northeastern and northern region of the country. The region is covered by savannahs, scrubland and forest (i.e. the Cerrado).

2 A biome is a major ecological community of plants and animals, such as a tropical rain forest, grassland, or desert.

3 It is estimated that around 25 million people live in the *Cerrado*, including 80 indigenous peoples as well as a variety of so-called traditional peoples, to whom Brazilian legislation gives special protection. Rede Social de Justiça e Direitos Humanos. *Imobiliárias agrícolas* transnacionais e a especulação com terras na região do MATOPIBA. 2018. P. 10. Available in Portuguese at: www.social.org.br/images/MATOPIBA.pdf.

agrochemicals, and loss of biodiversity. Additionally, violence against community leaders is on the rise, as are disputes over water, exacerbated by changing rainfall patterns due to eco-destruction.[4] Lastly, local people in the region are losing their land, leading to the destruction of their livelihood, community disruption, and food and nutrition insecurity. In many cases, they are forced to migrate to shanty-towns *(favelas)* of Brazilian cities. Women are particularly affected by the ongoing land grab and eco-destruction, as they can no longer collect and process wild fruits from the *Cerrado* forests, while the presence of armed guards, intimidation, and physical violence, makes it impossible for them to plan a family life.[5] Quite often, the only jobs available for rural women who have been displaced from their lands are on plantations with degrading conditions, or as house cleaners in urban areas.

4 Ibid.

5 FIAN International/Rede Social de Justiça e Direitos Humanos/ Comissão Pastoral da Terra. *The Human and Environmental Cost of the Land Business. The Case of MATOPIBA, Brazil.* 2018. Available at: www.fian.org.

GLOBAL FINANCE DRIVES LAND GRABBING IN MATOPIBA

The MATOPIBA region is witnessing the transformation of land into a dematerialized financial asset as a result of the growing power and influence of global finance, and its ways of operating – a process called 'financialization'. The incursion and expansion of agribusiness into the Brazilian *Cerrado* is closely linked to deregulation of global financial markets and the increasing interest of financial actors (pension funds, investment funds, banks, insurance companies, etc.) in land. The expansion of agro-industrial production since the 1990s in Brazil has been part of an ideological discourse of reduction, which in reality increases the country's debt because it relies on subsidized credit from the government, not to mention the social and environmental impacts caused by this agricultural system.[6] Significant state subsidies have led to the expansion of soy and sugar cane monocropping, which in the early 2000s started to penetrate into the northern part of the Brazilian *Cerrado*, especially into the states of Piauí and Tocantins.

Simultaneously, the quest for new areas of investment by global finance led, at the beginning, to a commodity boom, resulting in the speculative increase in the price of soy, sugar, corn, cotton, eucalyptus, and meat, amongst other commodities, further fueling the territorial expansion of monocultures and agribusiness. Between 2000 and 2014, the area planted with soy and sugarcane in the MATOPIBA region increased by 253% and 379% respectively and the area planted with soybeans increased from 1 million to 3.4 million h.[7] After the crisis of 2007/2008 though, a remarkable development started taking place: while the price of agricultural commodities decreased in international markets, the price of land continued to increase in Brazil. This explains the speculative nature of these land deals. The territorial expansion of monocropping of agricultural commodities (e.g. soy and sugarcane) serves to justify the increase in land prices, and for financial and agribusiness corporations to take control of farmland. Yet their target is land, independently of the production of commodities. More recently, the Brazilian Senate approved a measure that can further expand speculation with farmland by allowing parts of a farm to be negotiated in financial markets as a guarantee to access credit.[8] Consequently, land itself has increasingly become a target for financial actors and a business in its own right, beyond the financing of agro-industrial production or the trading of commodities. Land prices have kept rising even after the end of the commodity boom in the aftermath of the world financial crisis of 2007/08.[9]

6 Pitta, F., and Mendonça M.L. "Especulação com terras agrícolas na região do Matopiba". In: Direitos Humanos no Brasil. *Relatório da Rede Social de Justiça e Direitos Humanos.* 2017. PP. 55-64. Available in Portuguese at: www.social.org.br/files/pdf/relatorio_dh_2017.pdf.

7 Rede Social de Justiça e Direitos Humanos. *Supra* note 3. P. 26.

8 For more information, please see: Garcia, G. "Senado autoriza uso de parte de imóvel rural como garantia em empréstimo". *G1 Globo,* June 14, 2017. Available in Portuguese at: g1.globo.com/senado-autoriza-uso-de-parte-de-imovel-rural.

9 For more information on the 2007/2008 crisis, please see: Murphy, S. and Schiavoni, C. "Ten Years After the World Food Crisis: Taking Up the Challenge of the Right to Food". *Right to Food and Nutrition Watch* (2017): 16-25. Available at: www.righttofoodandnutrition.org.

Considered as Brazil's 'last agricultural frontier' and a buffer zone to the Amazon, lands in the northern part of the Brazilian *Cerrado* have become a target for land speculation.[10] Some of the companies involved in the land business in the region are still linked to industrial agricultural production. A case in point is the company SLC (Schneider Logemann Company), whose branch SLC Agrícola is one of the biggest Brazilian soy producers, while the branch SLC Land Co. has become a big player in the land business.[11] Other companies are no longer directly linked to production and fully concentrate on acquiring, selling, leasing and/or managing land.[12] One example is the company Radar Imobiliária Agrícola S/A, which was created through a joint venture between the US-pension fund TIAA and Brazil's largest sugar producing company, Cosan. Radar's objective is to obtain capitalized income from land – i.e. to acquire lands at low price – establish farms on that land and then sell it, often in speculative transactions. More importantly, the actors that are operating on the ground are backed by international financial actors that channel huge amounts of capital into the land business. They thus fuel the ongoing speculation, aiming to extract substantive wealth from the region. In the case of MATOPIBA, pension funds from the USA and Europe are big players.[13] These funds directly profit from climbing land prices, as this increases the value of their farms and their portfolios.

FINANCIALIZATION AND DIGITALIZATION

Financialization in general, and the financialization of land in particular, is linked in several ways to digitalization – i.e. the integration of digital technologies, based on the process of converting information into a digital format, also called 'digitization'. Firstly, the exponential growth of global finance over the last thirty years has only been possible because of information technology. Secondly, technical tools such as statistics, calculations on land use and productivity based on satellite images etc. have been used to transform land into an 'investible' resource, and to map those areas that are – supposedly – available for global investment.[14] Although these lands have been home to hundreds of local rural communities for centuries, they are presented from a typical neocolonial perspective as 'underutilized' or 'idle'. Thirdly, information technology is key in bringing land to the global financial market places.

In this context, it is important to distinguish two key aspects of the digitalization of land: on the one hand, the collection of very location-specific land-related data (such as soil quality, production outputs, water access, land price developments, etc.),[15] and on the other hand the digitalization of land administration data, in particular cadastral data. The first makes this information available for financial brokers anywhere in the world who want to operate in land markets, while the second (potentially) allows for land transactions in the virtual sphere. As such, the digitalization of land is an important part of the creation of a global real estate market.[16]

Currently, several efforts are underway to apply the blockchain technology to land. Blockchain is the technology underlying cryptocurrencies like Bitcoin and is commonly described as an open, distributed/decentralized ledger that can record information and transactions between two parties "in a verifiable and permanent way".[17] Pilot experiences are being carried out in different countries in all parts of the world, including Brazil.[18] The blockchain allows to store land administration data, but also to carry out transactions through so-called 'smart contracts', which happen in a largely automatized and self-enforcing way. While the broad application of these technologies to land may still take some time, the digitalization of land ad-

10 Rede Social de Justiça e Direitos Humanos. *Supra* note 3.

11 SLC controls almost halve a million h. of land in Brazil, with some 300,000 h. planted with soy. In 2015, SLC for the first time generated more income through its farmland purchases and sales than via its historic core business with soy. Rede Social de Justiça e Direitos Humanos. *Supra* note 3. P. 38.

12 Pitta and Mendonça. *Supra* note 6. PP. 58-59.

13 Global assets of pension schemes amount to more than US $41 trillion, which makes them the heaviest players of the financial industry. Consequently, any movement on their part generates huge waves. The US-based pension fund TIAA has installed two funds (TIAA-CREF Global Agriculture LLC, or TCGA, 1 and 2) to acquire farmland globally. The two funds have collected US $5 billion from pension schemes around the world, including the Dutch ABP, the second Swedish Pension fund AP2 as well as the German Ärzteversorgung Westfalen-Lippe (ÄVWL). They have acquired 300,000 h. in Brazil, including in the MATOPIBA region. For more information, please visit: www.thinkingaheadinstitute.org/Global-Pension-Asset-Survey-2018.

14 Li, T. "What is land? Assembling a resource for global investment". Plenary Lecture for the Transactions of the Institute of British Geographers, 39, 2014. PP. 589–602.

15 This collection (and privatization) of data in virtual clouds is underway under the banner of 'digitalization of agriculture', and is led by TNCs such as John Deere, AGCO and CHN. ETC Group. *Software vs. Hardware vs. Nowhere.* 2016. Available at: www.etcgroup.org/content/deere-co-becoming-monsanto-box.

16 Real estate is an attractive target of financial actors, making it one of the places where global finance capital materializes. For instance, substantial parts of big cities like London are owned by investment and other funds. Worldwide real estate assets (including agricultural lands) comprise nearly 60% of the value of all global assets and their value is estimated at almost three times the global GDP. Savills. *Around the World in Dollars and Cents.* Savills World Research, 2016. P. 4. Available at: www.savills.co.uk/around-the-world-in-dollars. Rural lands are one of the

ministration data is advancing, and in some countries land transactions are already increasingly automatized.[19] Discussions around the use of blockchain for real estate and land also refer to the possibility of 'fractional ownership', i.e. the possibility for several actors to acquire shares of a piece of land. This implies that a given plot is divided into 'conceptual shares', a good illustration of how digitalization allows for a growing dematerialization of land.

The digitalization of land and the use of blockchain in particular are promoted with the promise of additional transparency, efficiency, security and protection against fraud and corruption (especially due to the decentralized character of the blockchain). The related narratives strongly focus on inefficient states and administrations, conveying the message that private actors will be much more efficient when taking over the job of land administration in a decentralized way and without interference from public authorities.[20]

HUMAN RIGHTS IMPLICATIONS AND THE WAY FORWARD

Proponents of digitalization of land administration information and of using blockchain in land transactions emphasize the benefits of these technologies for marginalized people, because of the increased tenure security it supposedly will provide. However, the problem of land tenure insecurity of people living in poverty is less about accurate land information and much more about oppression and power inequalities. The question is, rather: who has access to and control over these technologies and for which purposes? In the case of MATOPIBA, for instance, affected communities have tried to register their lands in the Rural Environmental Registry (*Cadastro Ambiental Rural*, CAR) – an open online system based on GPS data – as part of their struggle to defend themselves against land grabbing. These communities then found out that their lands had already been registered by agribusiness companies.

The emerging issue is, therefore, how to ensure human rights accountability in the general context of digitalized land and environmental information. New devices and technologies are not deployed in a vacuum, nor is their use as clean and tidy as their technological nature pretends to suggest. Land is per se a material and a highly illiquid/immobile good. Despite all the digital developments, land will necessarily keep its very material and local character, meaning that the people who live on the land and off it, will be affected by transactions on global markets, even when these seem to happen in a purely digital sphere. In a way, the violence against local people, such as in the case of MATOPIBA, can be understood as the expression of the 'violence' required to transform land into a dematerialized asset using information technologies. In addition, land is a highly contested good. Thus today, users of these technologies – including governments – have to assess whether they are helping land grabbers to make legible non-formalized landed relationships and/or to re-write them to the detriment of marginalized and oppressed rural communities, or not.

At the same time, rural communities and their organizations in different parts of the world have been using tools like digital satellite images to defend their territories and better monitor the impacts of land grabbers' operations,[21] for instance with regards to the destruction of forests.[22] In any case, the obstacles for having physical and economic access to these technologies remain an issue of concern for vulnerable rural communities, and a key challenge to making them work in defense of their land rights. On the other hand, the very issue of whether formalization of

attractive options presented to investors, based on the prospect of "growing global food and energy needs". Ibid. P. 34.

17 Iansiti, M. and Lakhani, K. R. "The Truth About Blockchain". *Harvard Business Review* (2017). Available at: hbr.org/2017/01/the-truth-about-blockchain.

18 For more information, please visit: bravenewcoin.com/news/brazil-pilots-bitcoin-solution-for-real-estate-registration. Other pilot experiences are being carried out in Georgia, Ukraine, Sweden, India, Australia, Dubai, Honduras, USA and Ghana. Graglia, J.M., Mellon, C. "Blockchain and Property in 2018: at the end of the beginning". Paper presented at the Annual World Bank Conference on Land and Poverty, 2018. Available at: www.conftool.com/landandpoverty2018/index.php/02-11-Graglia-864_paper.pdf?page=downloadPaper&filename=02-11-Graglia-864_paper.pdf&form_id=864&form_version=final.

19 In the Netherlands, for instance, "the Real Estate property market is completely digitized" and "about 45% of all notarial deeds are processed completely automatically, without any human interference". Vos, J. "What Should We (Not) Do With Land Administration Data? The Risk of Privatization of Land Administration And Blockchain's Code As Law". Paper presented at the Annual World Bank Conference on Land and Poverty, 2018. PP. 20-21.

20 On the contrary, the example of TIAA illustrates a lack of transparency and accountability, particularly to its own clients, thus contradicting the idea that private actors are more efficient. FIAN International/Rede Social de Justiça e Direitos Humanos/Comissão Pastoral da Terra. *Supra* note 5.

21 Guajajara indigenous women struggle to protect their territories, using drones as part of their strategy. Lazzeri, T. "Guerreiras da Floresta enfrentam madeireiros em defesa de terra indígena". Reporter Brasil, March 08, 2018. Available in Portuguese at: reporterbrasil.org.br/2018/03/desmatamento-indigena-guerreiras-da-floresta-enfrentam-madeireiros-maranhao/.

22 For more information, please visit: www.globalforestwatch.org/.

landed relationships in new digital clothes is, above all, instrumental to the further commodification of land and nature (or not) will probably be hotly debated in the near future. For social movements and civil society organizations it remains crucial to understand if and how information technologies can become useful for people's struggles, and for the realization of rural communities' rights.

In this context, the struggle for a human right to land remains paramount, for it asserts that land is first and foremost a common good which communities and people access, control, manage and use in many different forms, in order to live a dignified life, according to their social and cultural context. As such, it recognizes, protects and guarantees a variety of tenure systems and tenure rights, seeking to democratize them wherever they are discriminatory. Moreover, it challenges the national and international policy and legal regimes, which are intending to transform land into a dematerialized commodity.[23]

23 FIAN International. "The Human Right to Land". *Position Paper* (2017). Available at: www.fian.org.

IN BRIEF

How can it be that finance centers in New York or Stockholm exercise control over remote lands in Northeastern Brazil? The process of transforming land into a global financial asset requires not only complex changes in policies and legislation, but also the use of information technologies. This article sheds light on the role of digital land information in the process of dispossessing rural communities from their land, which is subsequently put under the control of distant global finance actors. It draws on the authors' assessment of the drivers and impacts of agribusiness expansion in the Brazilian *Cerrado,* a biome consisting of savannahs and forests in the northeastern and northern region of Brazil, known by its acronym MATOPIBA. The article discusses the challenges posed by information technologies in people's struggles for their right to land and territory and concludes by identifying issues for further research.

KEY CONCEPTS

→ Financialization of land is the growing power and influence of global finance actors - such as pension funds, investment companies, fund managers, finance institutions and the mega rich, over land: who uses it, for what purposes and with which benefits.

→ Information technology (IT) is the use of computers to store, retrieve, transmit, and manipulate data, or information, often in the context of a business or other enterprise.

→ Digitalization is the integration of digital technologies, based on the process of converting information into a digital format

KEY WORDS

→ Financialization and digitalization of land

04

LET THEM EAT DATA

Trudi Zundel and Silvia Ribeiro

Trudi Zundel and **Silvia Ribeiro** are, respectively, Communications Coordinator and Latin America Director at ETC Group.

ETC Group works to address the socioeconomic and ecological issues surrounding new technologies that could have an impact on the world's poorest and most vulnerable people. It operates at the global political level and works closely with partner civil society organizations and social movements, especially in Africa, Asia and Latin America.

"Some fundamental shifts are underway down on the industrial farm. Both agro-input and farm machinery companies are investing heavily in 'precision agriculture', a vision of extreme mechanization in agricultural production, enabled by the convergence of powerful new digital technologies and algorithmic processing of big data. While the attention right now is on agro-input mergers, the moment is fast approaching when machinery companies and data platforms will set the future of industrial agriculture."

ACKNOWLEDGEMENTS |
Special thanks to Stephen Greenberg (African Centre for Biodiversity) and Antonio Onorati (Centro Internazionale Crocevia) for their support in reviewing this article.

The EU, US and other competition authorities are greenlighting more than a quarter trillion US dollars in agribusiness mega-mergers.[1] In last year's edition of the *Right to Food and Nutrition Watch*, Mariam Mayet and Stephen Greenberg warned that if the current three agribusiness mega-mergers on the table went through, farmers' sovereignty and the human right to adequate food and nutrition would suffer.[2] At the time of writing (early 2018), it is looking like all three will be approved and the three merged companies (Bayer-Monsanto, Dow-Dupont – now Corteva, and ChemChina-Syngenta) will control two thirds of seed and agrochemical markets,[3] increasing the power of corporations to dictate input prices and farmers' choices.

However, some fundamental shifts are also underway down on the industrial farm. Both agro-input and farm machinery companies are investing heavily in 'precision agriculture', a vision of extreme mechanization in agricultural production, enabled by the convergence of powerful new digital technologies and algorithmic processing of big data.[4] These technological advances and fights over the first round of mega-mergers in the agro-input sector foreshadow a second wave of consolidation that is not only about seeds or chemicals, but also about data. While the attention right now is on agro-input mergers, the moment is fast approaching when machinery companies and data platforms will set the future of industrial agriculture.

Precision agriculture – also called data-driven or digital agriculture – understands food production as an 'optimization problem', in Silicon Valley terms.[5] Weather records, soil moisture, pests, and crop history are turned into datasets and run through machine-learning algorithms that then inform automated farming machinery. A new wave of self-driving tractors, agricultural robots and aerial drones

1 International Panel of Experts on Sustainable Food Systems (IPES-Food). *Too Big to Feed: Exploring the Impacts of mega-mergers, consolidation and concentration of power in the agri-food sector.* IPES-Food: Thematic Report 3, 2017. Available at: www.ipes-food.org/Concentration.

2 Mayet, Mariam and Greenberg, Stephen. "The Three Agribusiness Mega-mergers: Grim Reapers of Farmers' Sovereignty". *Right to Food and Nutrition Watch* (2017): 70-78. Available at: www.righttofoodandnutrition.org.

3 IPES-Food. *Supra* note 1.

4 Advances in big data are making waves along the entire food value chain, from dematerialization of genetic information in seed and livestock breeding to agrochemicals and fertilizers; converging sensors, robotics and weather/market data in farm machinery; and big data-enabled market information in the commodity trade, transport and retail sectors. However, this article will only focus on the farm machinery sector.

coordinate with data from satellites, sensors and scouting drones that compute real-time information at as small a scale as five square centimeters,[6] and can determine where and when to apply seed, fertilizer, fungicide and pesticide to maximize yield while building proprietary datasets of farming information. In glossy presentations of precision agriculture, a modern farmer sips coffee, staring not at their field but at soil maps on an iPad as the bots and drones tend to the farm.

It may seem unconceivable, but agribusiness has been anticipating this technological change for some years and all major agricultural input enterprises are heavily investing in data-dependent precision agriculture technologies. Monsanto's almost 1-billion-dollar acquisition of Climate Corporation in 2013 marked a watershed moment, but in fact Deere & Co. (Deere) and others had already been outfitting their tractors with precision GPS for some time, as well as other computerized work systems. When, in September 2017, Deere announced it would acquire Blue River Technology – a company further outfitting tractors with cameras and computers using artificial intelligence to scan fields and identify weeds – Monsanto Growth Ventures (MGV) Investment Director speculated on its significance: "We can now see a legitimate path to a utopian time-not-too-far-away, where 'see and spray' fungicides, microbes, and, of course, weeding combinations of selective and non-selective herbicides, can be used to tend each plant individually."[7]

A NEW WAVE OF MERGERS IS CRESTING

The impulse of the agri-giants towards this new mechanization of the farm means that a second wave of mergers between agro-inputs and farm machinery is now almost certain. Monsanto, for example, is aggressively reformatting itself as data-robo-tech company in addition to biotechnology and conventional seed market. MGV has invested in digital agriculture companies like Blue River Technology; AgSolver, a US company that develops software and analytic systems for land management, valuation, and business planning; Vital Fields, an Estonian company that provides farm analytics for European farmers; and HydroBio, a US company that provides prescription irrigation recommendations. In 2015, Bayer bought Zoner, a Canadian company that analyzes satellite and aerial imagery and data on yield and soil electrical conductivity and provides real-time, field-level weather information.[8] In 2016, Bayer also acquired proPlant, a German firm that provides a system for plant health diagnosis, and partnered with Planetary Resources, a company with hyperspectral sensing technologies that sense soil moisture and temperature from satellite data.[9] Industry reports asserted that Monsanto's digital agriculture subsidiary Climate Corporation sealed Bayer's interest in acquiring Monsanto in this round of mergers.[10] Since Bayer and Monsanto signed their merger agreement, Climate Corporation has bought up precision agriculture start-ups with technologies for farm analytics, soil analysis, GPS-based information systems for plants and machinery and data analysis for irrigation.

On the other hand, farm machinery companies already own the machines and hardware that spread the seeds, pesticides, fertilizers and water, and that harvest the crop. Even more than the agro-input companies, it's the machinery companies who have the deep pockets to capture 'digital agriculture'. The global farm machinery market is valued at nearly $114 billion (compared to US $40.5 billion market for seeds and US $56.1 billion market for agrochemicals[11]) and the three biggest farm machinery companies – Deere (USA), CNH Industrial (Netherlands) and Kubota (Japan) – accounted for approximately half of total sales in 2014.[12] Like the agro-input

5 Thomas, Jim. "How corporate giants are automating the farm". *New Internationalist,* November 1, 2017. Available at: https://newint.org/features/2017/11/01/agriculture-robots

6 McCabe, Matthew, Houborg, Rasmus, and Lucieer, Arko. "High-resolution sensing for precision agriculture: from Earth-observing satellites to unmanned aerial vehicles". Paper Presented at Remote sensing for Agriculture, Ecosystems and Hydrology XVIII, 2016. Available at: repository.kaust.edu.sa/kaust/bitstream/10754/622870/1/999811.pdf.

7 Stead, Kiersten. "Blue River Technology's Journey to Acquisition". *LinkedIn Blogpost,* September 8, 2017. Available at: www.linkedin.com/pulse/blue-river-technologys-journey-acquisition-kiersten-stead/.

8 For more information, please visit: zoner.bayer.com.

9 Burwood-Tayler, Louisa. "Bayer Adds to Digital Farming Business with Planetary Resources Partnership as Startup Raises $21m Series A". *AgFunder News,* June 2, 2016. Available at: agfundernews.com.

10 Cowan, Emma. "The Race to Consolidation: Why Bayer is Backing the GMO Horse". *Agfunder News,* June 2, 2016. Available at: agfundernews.com.

11 IPES-Food. *Supra* note 1.

companies, they have been investing in the big data essentials like weather and market information for years and are combining this with precise field sensors and information about both seeding and harvests.[13] They have also been acquiring precision agriculture start-ups and entering joint ventures with the leading agro-input companies. For example, Deere has partnered with Syngenta (2007) on the *Force CS* insecticide delivery system; with DuPont-Pioneer (2013) linking Pioneer's precision agronomy software with Deere's hardware; as well as with Dow Agrosciences (2013) and BASF (2013) on data-sharing and Bayer CropScience (2014) on developing digital tools. CNH Industrial and AGCO (another farm machinery company) have also entered joint ventures around precision agriculture with big six companies.[14] Most notably, in 2015 Deere announced that it intended to acquire Precision Planting LLC, a Monsanto-owned precision agriculture equipment firm and announced a second agreement with Monsanto's Climate Corporation that allowed some of its equipment to wirelessly connect with Monsanto's Climate Fieldview platform.[15] In 2017, the Brazilian government and US Department of Justice blocked Deere's acquisition of Precision Planting LLC on grounds that it would give Deere a monopoly on precision farming technology.[16] In July 2017, AGCO announced that it would acquire Precision Planting LLC[17] and Deere made an offer on Blue River, another Monsanto subsidiary with the same technologies.

The machinery sector has the financial clout and proprietary weather and market data to take on the newly merged input entities. Regardless of who comes out on top, if the second wave of mergers goes through, the resulting companies will have oligopolistic control over the first half of the industrial food chain and almost half a trillion dollars in annual input sales.

HOW WILL THIS IMPACT THE RIGHT TO FOOD AND NUTRITION?

The right to food and nutrition and struggles for food sovereignty stand to lose a lot in a world of mega-mergers. The following are some of the main impacts:

→ **Reducing choices for farmers:** As industry insiders have observed: "Deere's ability to make farmers dependent on the usage and, increasingly, the maintenance of its specialized equipment bears relation to Monsanto's system of locking farmers into its herbicides and seeds."[18] Conceding even greater power to Deere & Co. and Monsanto is a giant step away from food sovereignty, reducing farmers' choices and raising input prices, and limiting their ability to repair or maintain their own machinery.

→ **Industrial farming creeps onto 'marginal' lands:** For now, the target audience of precision agriculture is large-scale Northern farmers. But small farmers in the Global South are also in the crosshairs. The precision and adaptability of these new tools may allow industrial monocultures to operate on so-called marginal lands, where peasant farming families, often women-led, produce 70% of the food that feeds the world.[19] The Bill & Melinda Gates Foundation, for example, is actively exploring the potential for precision agriculture to mechanize and incorporate big data driven farming models onto small farms. If history repeats, precision agriculture technologies in the hands of agribusiness may serve as a tool for land grabbing. As Jim Thomas writes: "If a drone can map it and a robot can farm it, why would an ag corporation not move the peasants off the land, seize their soil and bring in the agbots – massively extending the global land grab one data-driven, precision-farmed centimeter at a time."[20]

12 ETC Group. "Breaking Bad: Big Ag Mega-Mergers in Play Dow + Dupont in the Pocket? Next: Demonsanto?». *ETC Communiqué* n°115 (December 2015). Available at: www.etcgroup.org/content/breaking-bad-big-ag-mega-mergers-play.

13 IPES-Food. *Supra* note 1.

14 For more information on these ventures, please see: ETC Group. *Software vs. Hardware vs. Nowhere: Deere & Co. is becoming 'Monsanto in a Box'.* December 2016. Available at: www.etcgroup.org/content/deere-co-becoming-monsanto-box.

15 Monsanto. *New Agriculture Breakthroughs Poised to Support Farmers, Support Demands of a Growing Population.* 2016. Available at: www.onsanto.com/new-agriculture-breakthroughs-poised-to-support-farmers.

16 Plume, Karl. "Monsanto scraps deals to sell Precision Planting to Deere". Reuters, May 1, 2017. Available at: www.reuters.com/Monsanto-scraps-deal-Deere.

17 Monsanto. "AGCO to Acquire Precision Planting from The Climate Corporation". *Monsanto Press Release,* July 26, 2017. Available at: climate.com/newsroom/agco-to-acquire-precision-planting-from-the-climate-corporation/76.

18 Little, Amanda. "This Army of AI Robots Will Feed the World". *Bloomberg Businessweek,* January 11, 2018. Available at: www.bloomberg.com/news/features/2018-01-11/this-army-of-ai-robots-will-feed-the-world.

19 ETC Group. "Who Will Feed Us?". 2017. Available at: www.etcgroup.org/whowillfeedus.

→ **People-less farming:** Implicit in the vision of precision agriculture is a people-less farm managed through apps that may not even require their manager to be physically on site. The people who stand to lose in this equation are the 50 million farm workers employed by industrial agriculture whose jobs are at risk,[21] and smallholder farmers.[22]

→ **Degenerative organic?** The precision agriculture discourse has also raised new debates and widened rifts in the food movement. Advocates of precision agriculture claim that it will drastically reduce chemical use in industrial agriculture because they are applied in smaller, targeted amounts – perhaps even meeting requirements for organic agriculture. Companies with organic lines such as Driscoll's berries are already exploring deploying robotic pickers and weeders into the fields in place of farm labor, claiming this will drive down the cost of 'sustainable' agriculture. And precision farming systems can theoretically be set to just-about meet technical organic standards without deeply improving the health of soil and building resilience to climate change.

20 Thomas, Jim. 2017. "How corporate giants are automating the farm". *New Internationalist,* November 1, 2017. Available at: www.etcgroup.org/whowillfeedus.

21 ETC Group. *Supra* note 19.

22 Pimbert, Michel. "Towards Food Sovereignty: Reclaiming autonomous food systems". *International Institute for Environment and Development* 141 (2009): 8.

SUPPORTING AND STRENGTHENING FOOD SOVEREIGNTY AND AGROECOLOGY MOVEMENTS

We will not realize the right to food and nutrition by deepening and strengthening industrial food practices – the time has never been more urgent to assert that peasant farmers, especially women, are the keystones to addressing hunger, malnutrition and ensuring the right to food. We must reaffirm our commitment to food sovereignty: supporting and strengthening the rural social movements who have been demanding agrarian reform and right to territories; restoring farmers' right to save, plant, exchange, breed and sell seeds and livestock; removing regulations that block local markets; reorienting public research and development toward the public good, instead of private interest; addressing iniquitous trade policies; and establish and ensuring fair wages and working conditions for food and agricultural workers. All of these are directly threatened by the deployments of precision agriculture and its concomitant consolidation of power.

At the international and national scale, civil society must fight the mergers and demand that governments dismantle the power of agribusiness – that will require political will, and effective tools. Globally, civil society groups and a few Southern governments are advocating for a United Nations Treaty on Competition to keep corporations in check and incorporate environmental and socio-economic aspects into evaluations.[23] The newly-formed UN Forum on Science, Technology and Innovation and its Technology Facilitation Mechanism have seen debate on the need for the UN to address corporate concentration and technology monopoly. Meanwhile, the UN Committee on World Food Security in Rome worked to take up the seed and pesticide mergers as an urgent issue of Food Security in 2016 and 2017 – and will have even more demand to address the issue in 2018. As civil society learns from the current wave of agro-input mergers, it's not too early to build the movement to stop the data-driven sequel of mergers.

23 ETC Group. "Europe bows to Bayer-Monsanto... US may follow". *News Release,* March 20, 2018. Available at: www.etcgroup.org/content/news-release-four-farm-europe-and-us-regulators-may-bow-bayer-monsanto-and-basf.

IN BRIEF

As the 'mega-mergers from hell' that have rocked the input sector since 2015 are wrapped up (Bayer-Monsanto looking likely to be approved by the US at the time of writing), advances in big data, robotics and remote sensing, under the umbrella of 'precision agriculture', are likely to drive a new wave of mega-mergers in the food system, this time between agro-input and farm machinery companies. This article shows how both agro-input and farm machinery companies are buying up precision agriculture start-ups and entering joint ventures to share their data, software and hardware. If the second wave of mergers goes through, the resulting few companies will have oligopolistic control over the first half of the industrial food chain and almost half a trillion dollars of annual inputs sales. This will reduce choices and raise input prices for farmers; give industrial agriculture the tools and ability to operate on marginal lands that are currently home to many of the world's peasant and family farmers; threaten millions of workers and small-holder farmers while achieving its vision of 'people-less' farming; and muddy the waters of 'sustainable' agriculture, making it easier for industrial farmers to meet organic standards without building soils or resilience. To protect the right to adequate food and nutrition, we must reaffirm our commitment to peasant-led agroecology and food sovereignty and push for a UN Treaty on Competition that will empower governments to keep corporations in check.

KEY CONCEPTS

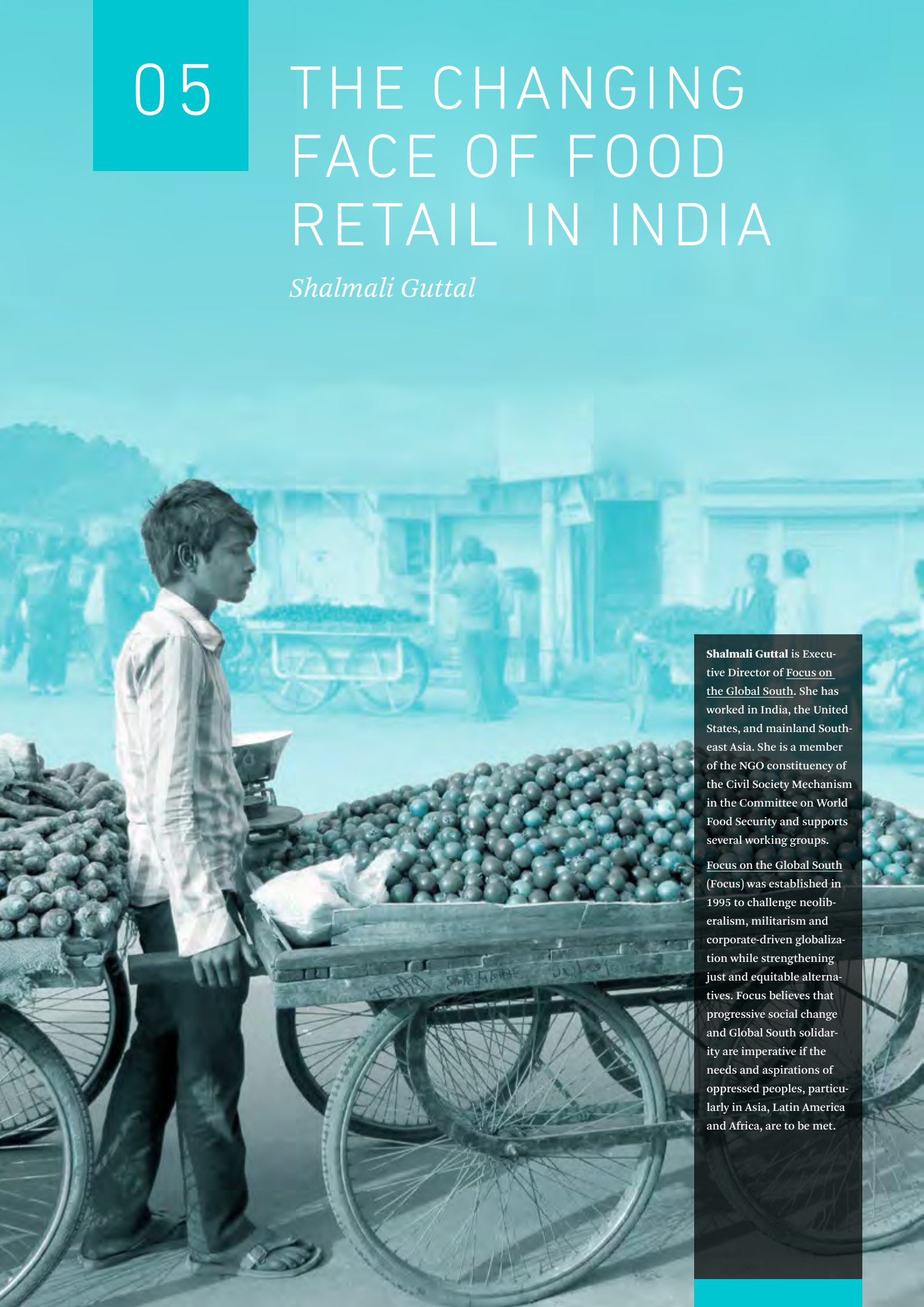
- → Agriculture companies are moving toward big-data enabled precision agriculture – a vision of extreme mechanization and automation on the farm.
- → After first wave of mega-mergers, four companies control 60% of agrochemicals market – another round of mergers between agrochemicals and farm machinery companies is likely.
- → If the new wave of mergers go through, the resulting companies will have oligopolistic control over nearly half a trillion dollar input industry.
- → We must reaffirm commitment to food sovereignty and push for a UN Treaty on Competition that would evaluate corporate mergers on environmental and socio-economic grounds.

KEY WORDS

- → Precision agriculture
- → Mega-mergers
- → Corporate consolidation
- → Food sovereignty
- → Corporate governance

05 THE CHANGING FACE OF FOOD RETAIL IN INDIA

Shalmali Guttal



Shalmali Guttal is Executive Director of Focus on the Global South. She has worked in India, the United States, and mainland Southeast Asia. She is a member of the NGO constituency of the Civil Society Mechanism in the Committee on World Food Security and supports several working groups.

Focus on the Global South (Focus) was established in 1995 to challenge neoliberalism, militarism and corporate-driven globalization while strengthening just and equitable alternatives. Focus believes that progressive social change and Global South solidarity are imperative if the needs and aspirations of oppressed peoples, particularly in Asia, Latin America and Africa, are to be met.

"To date, there is little reliable evidence to back the claims that corporate food retail will enhance food security and employment. Global experience shows that supermarkets tend to restructure food production and markets to cater to expanding global value chains and international markets. In India, such restructuring will undermine territorial markets that are vital to the survival and well-being of majority of the population, particularly women."

ACKNOWLEDGEMENTS |

Special thanks to Emily Mattheisen (FIAN International) and Nora McKeon (International University College Turin, Roma 3 University and Terra Nuova) for their support in reviewing this article.

Food is the largest retail consumption category in India, and food and grocery retail constitute 60-65% of India's total retail market. The Indian food retail market is the sixth largest in the world and expected to grow to 61 trillion Indian Rupees (INR) (US $ 918 billion) by 2020. With growing urbanization, the expansion of a corporate-dominated private sector, increasing numbers of professionals with changing lifestyles, and the push by the Government of India (GoI) towards digitalization, India is a coveted market for corporate food retailers, both domestic and foreign.

More than 85% of India's current food retail value comes from localized, non-corporate retail.[1] Most urban consumers – from small towns to large cities – tend to purchase groceries from local, family run provision stores, (called 'kirana stores'), cooperatives, small fruit/vegetable/meat/poultry/fish shops, wholesale fresh horticulture markets, and local fruit and vegetable vendors with pushcarts. While supermarkets have made significant inroads in numerous cities and large towns, they still compete with more conventional, localized forms of retail that offer fresh, seasonal and culture-specific foods, personalized service, quick home deliveries and the ability to purchase on monthly (or even longer term) credits. Most middle-class shoppers buy fruits, vegetables, dairy, meat and fish in small quantities daily, or once every two to three days. Poorer families depend on subsidized staples from the Public Distribution System (PDS) and other foods from hawkers. Purchasing from localized outlets allows shoppers to purchase affordable quantities, assess quality by seeing and touching, and place orders for specific foods. It also provides opportunities for outings, social interactions, and catching up on neighborhood news.

1 KPMG. *India's Food Service Industry: Growth Recipe.* FICCI: 2016. p. 3. Available at: www.kpmg.com/in/Indias-food-service-industry-growth-recipe.

The story in rural areas is different. About 70% of India's rural households depend primarily on agriculture for their livelihoods. Daily food needs are met through a combination of production, foraging and purchase. Food retail is conducted through direct purchase from producers, markets scheduled at fixed times (for example, weekly, or biweekly), state supported cooperatives, and wholesale markets in small towns. Purchasing power depends on good weather and harvests, family indebtedness, employment, secure access to productive resources (land, water, seeds, livestock, fuel, etc.) and essential services (health, clean water, transportation, electricity, etc.).

The value and importance of such retail is encompassed in the concept of 'territorial markets' articulated by social movements and civil society during a policy process in the Committee on World Food Security (CFS) on Connecting Smallholders to Markets.[2] Territorial markets are those through which the majority of food consumed in the world is channeled: they are highly diverse, providing flexibility for a variety of small-scale food producers, their organization and management range in scale and formality, and they are crucial in meeting food demands in rural, peri-urban and urban areas. They involve several small-scale actors such as producers, processors, transporters and traders, and they provide spaces where women are actively engaged, can assert some measure of authority, and build new skills and knowledge.[3]

The expansion of corporate food retailing will surely affect these crucial territorial markets and raises several questions: how will corporate retail affect millions of small-scale food producers, workers and local vendors, and their access to productive resources? How will it influence food cultures, availability of local foods and food production? What will be its impacts on public health, food security and nutrition?

HUNGER AMIDST PLENTY

India is one of the largest food producers in the world and has the potential to be food secure through domestic production.[4] Yet, India is home to the largest undernourished population in the world: 190.7 million people (14.5% of the population) go hungry everyday; about 48% of children under the age of five are stunted, 20% are wasted and 43% underweight; and about 55% of women and 24% of men are anaemic.[5] Despite being the world's third largest economy, India's ranking in the 2017 Global Hunger Index is a shocking 100 out of 119 surveyed developing countries.[6] Hunger is most prevalent in areas where people depend on subsistence agriculture and foraging, among urban destitute peoples, and in conflict and war zones.

Girls and women face deeply entrenched social-cultural discrimination that manifests in unequal access to food, health care, education, paid work and resources. Policies to address hunger tend to be gender biased, focused on children while bypassing mothers and female care providers in households, and blind to entrenched family preferences for male over female children. In poor families, women often eat last, after working full days and feeding their families.

The reasons for this dismal situation include lack of political will, dysfunctional bureaucracies, inadequate infrastructure, post-harvest losses and food waste, and entrenched social-cultural prejudices.[7] Nearly 40% of the fruits and vegetables and 20% of the grain produced are lost because of poor storage and distribution. Some estimate that the value of food lost is enough to feed over 500 million people.[8]

2 For more information, please see: Goita, Mamadou, McKeon, Nora and Nadjirou Sall. "Insight 4.1 Peoples' Markets or Corporate Supply Systems? Negotiating in the Committee on World Food Security". *Right to Food and Nutrition Watch* (2016): 41-43. Available at: www.righttofoodandnutrition.org.

3 For a comprehensive analysis of territorial markets, please see: Food Security and Nutrition Civil Society Mechanism (CSM). *Connecting Smallholders to Markets, An Analytical Guide.* 2016. Available at: www.csm4cfs.org/wp-content/uploads/2016/10/ENG-ConnectingSmallholdersToMarkets_web.pdf

4 For more information, please visit: www.fao.org/india.

5 *Ibid.*

6 IFPRI. *Global hunger index: the inequalities of hunger*. 2017. Available at: www.ifpri.org/publication/2017-global-hunger-index-inequalities-hunger.

7 Singh, Jaginder. "India is self-sufficient, but millions go hungry". *The Pioneer*, October 3, 2016. Available at: www.dailypioneer.com/columnists/edit/india-is-self-sufficient-but-millions-go-hungry.html.

8 Bas, Paris. "Reducing Food Loss and Waste in India". *India Food Security Portal,* May 4, 2016. Available at: india.foodsecurityportal.org/regional-sub-portal-blog-entry/india/725/food-access.

In 2013, following a public interest litigation and years of campaigning by rights and justice advocates, the Indian Parliament enacted T*he National Food Security Act* (2013) (NFSA).[9] The NFSA brings under a single umbrella several entitlements aimed at ensuring food security and realizing the human right to adequate food and nutrition, which is enshrined in the Indian Constitution. However, the NFSA has faced significant criticism for being: narrow in scope and vision; focused more on grain hand-outs through the PDS than on peoples' entitlements and preventing malnutrition and starvation; meagre in maternity benefits; giving the government sweeping powers to modify entitlements; and limiting government accountability.[10]

Since economic liberalization in the early 1990s, economic inequality has steadily risen and land, nature, labor and peoples wellbeing have become targets of aggressive capitalist exploitation. All governments in power have embraced neoliberal economic policies, large infrastructure development and information technology in the guise of modernization, poverty reduction, combating hunger, etc. In 2015, the GoI launched Digital India, a program purportedly aimed at digitally empowering all Indians by: expanding internet connectivity to rural areas; establishing digital infrastructure for banking, financial transactions, public records, delivery of government services (e-governance), data storage services, marketing, etc.; and increasing information technology jobs.

Two recent GoI ventures involving digitalization, however, have proved detrimental to arresting poverty and hunger: the *Aadhaar* and demonetization. In 2016, the Indian Parliament passed an act called *The Aadhaar Act* (2016),[11] intended to provide efficient, transparent and targeted delivery of benefits and services through the assigning of unique identity numbers to individuals residing in India. The GoI demands that peoples' *Aadhaar* numbers be linked to their earlier, official forms of identification for them to have access to governmental services and programs. This has proved disastrous for hundreds of thousands of rural peoples, who have been denied their legally recognized rights to work, fuel subsidies and food entitlements, and have in some cases starved to death.[12]

In November 2016, the GoI removed from circulation 500 and 1000 INR notes (which made up 86% of the country's currency) in a supposed bid to flush out undeclared cash ('black money') and digitalize the economy by forcing a shift to electronic payments. This was brought into force without adequate public notice and facilities to exchange the demonetized notes to other denominations. Within days, daily wageworkers, farmers, poor families, small traders, retailers and contractors, lost much of their savings. The construction industry, agriculture, small businesses and health services ground to a halt: there was no cash to pay workers, buy seeds for planting or fuel to transport produce, pay medical fees, provide midday meals for poor children, etc. Indebtedness among poor families increased and farmers' suicides rose sharply. Demonetization precipitated an economic crisis whose full impacts on people and the economy has still to be fully assessed. Little 'black money' was recovered and barely a year later, the use of cash over online payments was back in almost full force, showing digitalization of the economy to be a hugely damaging exercise.[13]

CASHING IN ON FOOD

Till about five years ago, food retail in the country was dominated by Indian corporations, some of which started venturing into online retailing with varying degrees of success. This is changing gradually as the GoI opens India's retail sector to For-

9 *The National Food Security Act* (2013). Available at: www.egazette.nic.in/WriteReadData/2013/E_29_2013_429.pdf.

10 For more information, please visit: www.righttofoodcampaign.in/site/bodhirights/food-act/campaign-material-1.

11 *The Aadhaar (Targeted Delivery Of Financial And Other Subsidies, Benefits And Services)* Act (2016). Available at: uidai.gov.in/images/the_aadhaar_act_2016.pdf.

12 Pachisia, Stuti. "No Aadhaar, no food rations: 11 stories that show the Jharkhand child death was no aberration". *Scroll.in*, October 20, 2017. Available at: scroll.in/article/854587/no-aadhaar-no-food-ration-11-stories-that-show-the-jharkhand-child-death-was-not-an-aberration; and Johari, Areefa. "Yet another Aadhaar-linked death? Denied rations for 4 months, Jharkhand woman dies of hunger". *Scroll.in*, February 3, 2018. Available at: scroll.in/article/867352/yet-another-aadhaar-linked-death-jharkhand-woman-dies-of-hunger-after-denial-of-rations.

13 Ghosh, Jayati. "De-digitisation of India". *Frontline*, October 27, 2017. Available at: www.frontline.in/columns/Jayati_Ghosh/dedigitisation-of-india/article9892253.ece.

eign Direct Investment (FDI) in a bid to attract foreign investment capital, but at the same time also placate Indian businesses that are important vote banks.

In June 2016, the GoI permitted 100% FDI in food retail including through brick and mortar (B&M) outlets and e-commerce, provided all the goods sold were produced, processed and manufactured in India. Proponents claimed that FDI in food retail would reduce food waste, encourage agricultural diversification, strengthen the domestic food industry, build food supply chains and markets that benefit farmers/fishers, develop entrepreneurship, create jobs and accelerate employment, eliminate middlemen and associated transaction costs (which would benefit both producers and consumers), and ensure food security. To date, however, there is little evidence to back these claims.

In July 2017, Amazon won approval for a proposal to invest about US $500 million to build a food retail business through a new entity, Amazon Retail (the first in India). Amazon already had a significant presence in India through Amazon Pantry.[14] Amazon Retail can directly source and sell groceries, including food, build its own inventories and control the supply chain. Amazon is preparing to secure a sizable chunk of India's grocery market through both B&M and online retail. It is also negotiating a possible alliance with the Future Group, one of India's largest retailers that controls nearly a third of the domestic grocery market.[15]

Amazon faces competition from Indian retailers who are using domestic and foreign capital investment to shore up their presence in digital food retail, including Flipkart, Grofers and most significantly, BigBasket. Founded in 2011, BigBasket operates across 26 cities and isconsidered a pioneer and leader in online food retail.[16] It manages its own supply chains, runs its own warehouses and offers a large assortment of food and beverage products. BigBasket aims to build the largest grocery retail in India (B&M and online) and is tailoring its operations to meet the needs of consumers, as well as of small neighborhood shops. BigBasket recently secured financing of about US $300 million from its largest shareholder, The AliBaba group.[17] The Alibaba group is a Chinese Internet conglomerate that owns investments in top Indian online retail spaces such as Paytm (a digital wallet firm) and PaytmMall (an online marketplace), and is a global competitor of Amazon. The new financing will strengthen BigBasket's ability to compete with Amazon and other online retailers.

Massive infusions of investment capital in India's grocery retail sector have set the stage for corporate retailers to simultaneously expand in B&M and online retail. To ensure competitiveness, retailers will seek greater control over food supplies and influence over consumer preferences and behavior. Controlling supply chains implies control over land, water, plant and animal varieties, labor, materials, energy and transportation for production, processing, storage, refrigeration, shops, packaging, delivery, etc., which have far reaching economic, social, environmental and climate impacts.

The expansion of corporate food retail is also linked to the aspirations of middle class consumers, especially in small towns for whom corporate supermarket type consumption implies modernity and cosmopolitanism. And there are practical aspects to this: with the expansion of the corporate private sector, migration of middle class professionals across the country is increasing, and families have to purchase food in unfamiliar places. India's urban areas are becoming more crowded and expensive. More women are entering the work force and spend substantial amounts

14 For more information, please visit: www.amazon.in/gp/pantry/info.

15 Malviya, Sagar. "Kishore Biyani explores Future Group's journey with Amazon". *The Economic Times*, February 6, 2018. Available at: economictimes.indiatimes.com/industry/services/retail/kishore-biyani-explores-future-groups-journey-with-amazon/articleshow/62798408.cms.

16 Big Basket. *The Abraaj Group - Partner Company* Case Study. 2016. Available at: www.abraaj.com/wp-content/uploads/2017/02/Abraaj-Case-Study-Big-Basket.pdf

17 Bansal, Varsha. "BigBasket receives $200 million in a round led by Alibaba". *The Economic Times*, February 2, 2018. Available at: economictimes.indiatimes.com/small-biz/startups/newsbuzz/big-basket-receives-200-million-in-a-round-led-by-alibaba/articleshow/62744825.cms.

of time at work and commuting. These make supermarket retail – particularly online retail – more attractive. Since women remain largely responsible for stocking kitchens and feeding their families, they will be the main targets of aggressive advertising by corporate retailers with promises of familiar foods, convenience, lower prices, freshness and hygiene.

SUPPORT PEOPLE, NOT CORPORATIONS

To date, there is little reliable evidence to back the claims that corporate food retail will enhance food security and employment. Global experience shows that supermarkets tend to restructure food production and markets to cater to expanding global value chains and international markets. In India, such restructuring will undermine territorial markets that are vital to the survival and wellbeing of majority of the population, particularly women.

Agrarian distress in India shows little sign of abating as farmers and fisherfolk continue to face indebtedness, land and resource grabbing, and near absence of supportive policies. More than 90% of India's workforce is engaged in informal labor without written contracts, social security, workplace benefits and job security. Agriculture is the biggest informal work employer followed by manufacturing, construction and trade. A significant proportion of workers in the organized sector are informal workers,[18] and ''contractualization' of labor is on the rise as businesses seek to cut costs and increase competitiveness.[19]

Supermarkets have long promoted contract farming in which, farmers have little negotiating power, and are not assured of protection against market vagaries, price volatility, production failures and changes in corporate plans. Conflicts between rural communities, companies and the government over control of land and water for extractive, industrial and development projects have increased over the past decade. Land acquisition for food production, processing and storage will escalate such conflicts even further. Processing and packaging plants will suck water and resources from their environments and create huge amounts of waste.

Corporate food retail will indeed provide employment at various skill levels and even absorb some of those who lose their lands, but it will also lead to the closure of local groceries, endangering the livelihoods and food access of millions of people.[20] Evidence gathered through various CFS processes attests to the importance of small-scale food production and territorial markets in battling hunger and poverty, and enhancing the right to food. Territorial markets are directly linked to local, national and regional food systems and economies where, value-adding processes circulate among and benefit those who contribute to the creation of value. The value created is not only financial, but includes (among others) nutrition, dietary diversity, employment, knowledge exchange, social support, services, and empowerment of women and youth.

Rather than allowing corporations to control its food markets and food cultures, the GoI should enact public policies that support small-scale food producers, workers and territorial markets.[21] These include policies on pricing, public procurement, production of safe and nutritious food, appropriate credit and infrastructure, knowledge enhancement, capacity building, etc.[22] In the absence of such proactive policies, corporate food retail will increase gaps in income, wealth, food access and nutrition across class, gender, and between rural and urban areas.

18 For example, employing 1.2 million people – of whom 70% are women – the tea industry is India's second largest employer in the organized sector. For more information on their situation, please see: Longley, Sue. "The Price of Your Cup of Tea: Human Rights Violations in India's Tea Plantations". *Right to Food and Nutrition Watch* (2016): 60-61. Available at: www.righttofoodandnutrition.org.

19 Himanshu. "Is informal the new normal?". *Livemint*, May 22, 2017. Available at: www.livemint.com/is-informal-the-new-normal.

20 For example, in the USA, Amazon pays below average wages and many of its workers cannot afford to put food on the table without federal safety nets. Brown, H. Claire. "One third of Amazon employees in Arizona need food stamps to feed themselves". *The New Food Economy*, April 19, 2018. Available at: newfoodeconomy.org/amazon-snap-employees-five-states.

21 CSM. *Supra* note 5.

22 Committee on World Food Security (CFS). *Policy Recommendations, Connecting Smallholders to Markets*. 2015. Available at: www.fao.org/3/a-bq853e.pdf.

IN BRIEF

With growing urbanization, changing lifestyles and digital commerce, India is a coveted market for corporate food retailers. However, most urban consumers purchase food from local, family run stores, fresh markets and vendors with pushcarts. Poorer families depend on subsidized staples from the Public Distribution System. In rural areas, daily food needs are met through own production, foraging and small-scale trading. The importance of such retail can be understood through the concept of "territorial markets", through which the majority of the food consumed in the world is channeled.

Despite being one of the world's largest food producers, India is home to the largest undernourished population in the world. Hunger is most prevalent in areas where people depend on subsistence agriculture and foraging, among urban poor, and in conflict zones. Girls and women bear the brunt of hunger and hardship because of deeply entrenched social-cultural discrimination and policies that tend to be gender biased. In poor families, women often eat last and least.

Global experience shows that supermarkets tend to restructure food production and markets to cater to expanding global value chains and international markets. In India, such restructuring will increase gaps in income, food access and nutrition across classes, gender, and between rural and urban areas, and undermine the human right to adequate food.

On the other hand, territorial markets are directly linked to local, national and regional food systems and economies, and contribute positively to nutrition, dietary diversity, employment, knowledge exchange, social support, services, and empowerment of women and youth. Rather than allowing corporations to control food markets and shape food cultures, the Indian Government should enact public policies that support small-scale food producers, workers, the poor and especially women, and strengthen territorial markets that are vital to the survival and wellbeing of majority of the population.

KEY CONCEPTS

→ Food is the largest retail consumption category in India, and food and grocery retail constitute 60-65 % of India's total retail market, which is greatly coveted by corporate food and grocery retailers.

→ More than 85 % of India's current food retail value comes from localized, non-corporate retail, which is encompassed in the concept of territorial markets: markets that are diverse and flexible in terms of scale, organization and formality, and crucial in meeting food demands in rural, peri-urban and urban areas.

→ Despite being one of the largest food producers in the world, India is home to the largest undernourished population in the world. Girls and women face unequal access to food, health care, education, paid

work and resources because of deeply entrenched social-cultural discrimination and policies that tend to be gender biased.

→ Global experience shows that supermarkets tend to restructure food production and markets to cater to expanding global value chains and international markets. In India, such restructuring will undermine territorial markets that are vital to the survival and wellbeing of majority of the population.

→ Rather than allowing corporations to control food markets and food cultures, the Indian Government should enact public policies that support small-scale food producers, workers and territorial markets, including policies on pricing, public procurement, production of safe and nutrition food, appropriate credit and infrastructure, knowledge enhancement, capacity-building, etc.

KEY WORDS

→ Corporate food retail
→ Digitalization
→ Territorial markets
→ Supermarkets

06

DIGITALIZED NUTRITION OR PERSONALIZED MALNUTRITION?

Isabel Álvarez and Paola Romero

Isabel Álvarez is advocacy officer at URGENCI.

Paola Romero is project coordinator, and gender and women's rights officer at FIAN Colombia.

URGENCI, the Global Network for Community Supported Agriculture, promotes all forms of partnership between producers and consumers who seek to build a different type of relationship, and thereby, a different food system.

FIAN Colombia is a national section of FIAN International. It promotes the realization of the human right to adequate food and nutrition in Colombia via training, advocacy, and research at community level.

"[C]onsumers have become yet another target to the service of food corporations, whose data-gathering mechanisms employ algorithms that categorize customers and generate personalized offers. The main question, however, is: what criteria are applied? Where does nutrition fit in? What type of products are being targeted and promoted for increased consumption? And to this purpose, what persuasion mechanisms are used?"

ACKNOWLEDGEMENTS |
A special thanks to Sofía Monsalve (FIAN International), Marcos Arana Cedeño (International Baby Food Action Network, IBFAN) and Juan Carlos Morales González (FIAN Colombia) for their support in reviewing this article.

Over the last few decades, the technological and digital revolution has been generating social change at a rapid pace. In 2001, Professor Marc Prensky was already talking of two categories of human beings, depending on their relationship to technology: digital natives and digital immigrants.[1] These categorizations, now widespread, shed light on the central role played by digital technologies today.

It is undeniable that technological advances in communication over the last decades have culminated in unprecedented accessibility. Nevertheless, as we now turn our attention to the global panorama of the last two decades, it will become apparent that there are many parallel developments worth noting. Firstly, the inequality gap between the richest and those living in the utmost poverty has widened. Since 2015, 1% of the world's population owns more wealth than the remaining 99%.[2] Secondly, in 2016, after three years of decline, the number of malnourished people in the world rose up to 815 million,[3] 38 million more than in 2015. Thirdly, the earth has become urban, and, in 2015, 244 million people (1 in 30) emigrated from their countries of origin as a result of conflict, persecution, environmental degradation

1 Digital natives are those generations born and raised with digital technology, whilst digital immigrants have adopted these technologies later in life. Similarly, Prensky differentiates between "legacy" content – which includes "reading, writing, arithmetic, logical thinking" – and "future" content, which is "digital and technological", such as software, hardware, robotics, as well as ethics and languages. Prensky, Marc. «Digital Natives, Digital Immigrants». *On the Horizon*. 9:5 (2001). Available at: www.csm4cfs.org/wp-content/uploads/2016/02/CSM-WG-Nutrition-Driving-Ideas-13-Jan.pdf.

2 Oxfam. "An Economy for the 99%". *Briefing Paper* (2017). Available at: www.oxfam.org/economy-99.

3 FAO. *The State of Food Security and Nutrition in the World.* Rome: FAO, 2017.

and lack of opportunities, among other issues.[4] Thus, one can speculate that the advance in technology has neither resulted in a decrease of malnourished persons, nor has it improved the distribution of wealth, or access to better livelihoods. It is for these reasons that questions need asking as to what type of innovations and technological applications are being promoted in the food and nutrition arena, and how these correspond to existing approaches.

Currently, although the human right to adequate food and nutrition is present in the *discourse* of several institutions, including the United Nations, in *practice*, the inclusion of the nutritional dimension of the right to food is addressed in a skewed and imprecise manner. Meanwhile, organized civil society proposes a more holistic vision of nutrition linked to the right to food, from an all-encompassing perspective that goes from the seed to the plate,[5] and that defies the medicalized and nutritionistic visions, which are so closely bound to corporate power.[6]

THE MEDICALIZATION AND COMMERCIALIZATION OF NUTRITION

Historically, nutrition, as a form of food-related workable knowledge, has developed in a controversial and complex manner. For example, during the first half of the 20th century, nutrition – within the framework of medical practices – was used for state control and as a weapon to repress social protests. This can be seen in the hunger strikes that were employed as a strategy for asserting political demands, protests and claims for freedom.[7] After World War II, the need for European reconstruction meant that nutrition as a practice took on a different hue, moving towards a social approach. The main concern was what to do to ensure that society did not go hungry – there was a shift towards analyzing the determining factors of hunger, partly leaving to one side the idea that hunger was exclusively the responsibility and fault the hungry.

Nonetheless, the approach continues to be centered on the study of diets and on a thermo-dynamic vision of nutrition, which equates the body – which needs to be fed – to a machine. Some institutions' position on nutrition therefore continues to revolve around the technical aspects of nutrition – that of consumed energy and food components (macronutrients, micronutrients), leading them to focus on the final product's properties. Hence, food is viewed as a commodity or a consumable product, rather than as part of the commons, and no attempt has been made to try and understand all of the steps that make up the food process.

The aforementioned approach corresponds to a fragmented and individualist vision of nutrition that lacks a human rights perspective. First of all, it views people as consumers and not as rights holders.[8] Secondly, the consumer shoulders the responsibility of any harm that can come from eating and nourishing themselves, rather than the duty bearer, i.e. the state. This implies that consumers are responsible for their own nutrition, while the corporate sector concentrates new technologies for control and 'improvement' of food, based solely on the consumers' decisions and eating habits. Thirdly, this reductionist vision of nutrition concentrates on individual consumer behavior and builds upon the premise that dietary decisions are made in a vacuum and can be perfected via the use of technologies, without acknowledging the political, economic and socio-cultural factors that condition the way we eat.

4 International Organization for Migration (IOM). *World Migration Report*. Geneva: IOM, 2018. Available at: www.iom.int/wmr/world-migration-report-2018.

5 "It is our common understanding that food is the expression of values, cultures, social relations and people's self-determination, and that the act of feeding oneself and others embodies our sovereignty, ownership and empowerment." Food Security and Nutrition Civil Society Mechanism (CSM). "Preliminary Vision on Nutrition". (2015). Available at: www.csm4cfs.org/wp-content/uploads/2016/02/CSM-WG-Nutrition-Driving-Ideas-13-Jan.pdf.

6 For more information, please see: Rundall, Patti. "The 'Business of Malnutrition': The Perfect Public Relations Cover for Big Food". *Right to Food and Nutrition Watch* (2015): 26.

7 One case in point is the British empire, as it fought to scientifically and morally delegitimize both the suffragettes' and Ghandi's hunger strikes. In the former case, women were force fed by means of torture under the supervision of a doctor. Vernon, James. *El hambre. Una historia moderna.* Universitat de València. 2011. PP. 92–97; BBC History Magazine. "Cat and mouse: force feeding the suffragettes". *BBC History Extra*, June 2009. Available at: www.historyextra.com/period/edwardian/cat-and-mouse-force-feeding-the-suffragettes/.

8 For more information, please see: FIAN Colombia. *Perspectivas sobre derecho a la alimentación y nutrición adecuadas.* 2018. PP. 32–33.

DATA ON WHAT WE EAT

Technological advances and access to digital media could indeed be an ally in the fight against malnutrition,[9] but for this to happen, a human rights-based approach would be needed. Nowadays, the most accessible technology can be found via apps on mobile phones and other devices, which provide an instant gateway to a wealth of information and entertainment. If nutritional betterment were the goal, then that same information could be used, for instance, to promote local economies, put producers in touch with consumers, support food cultures, highlight the (unequal) role played by women in food production, to name but a few of the food-related areas that could be supported and developed in a positive manner.[10] Yet, the overall reality we face today is that these devices have become a source of information to enhance and enrich specific markets that peasant producers – whose food is actually more nutritious[11] – do not have access to.

In this context, consumers have become yet another target to the service of food corporations, whose data-gathering mechanisms employ algorithms that categorize customers and generate personalized offers.[12] The main question, however, is: what criteria are applied? Where does nutrition fit in? What type of products are being targeted and promoted for increased consumption? And to this purpose, what persuasion mechanisms are used?

This focus on personalization is not limited to corporations; it can also be transferred to other food-related areas. For example, at the World Economic Forum, genetic analysis for personalized nutrition was discussed.[13] This area consists of analyzing DNA in order to predict the reactions to certain nutrients. Samples are sent to an entity, which processes genetic data and sends a 'personalized' diet plan to the 'user' via a mobile app. Not only is this proposal not accessible to all, it also strengthens a totally individualistic and fragmented approach that is detached from and at odds with the environment. Persons are treated as a total sum of molecules, without taking into account their social, cultural and economic variables. What's more, those who own these technologies are feeding information into important databases on the human genome and eating habits.

A 'MALNUTRITION' APPROACH

This individualizing reductionism is also mirrored in the decontextualized encouragement of physical activity, which the corporate sector exploits to make more profit. In fact, large corporations promote ultra-processed products (junk food), with no state control, whilst simultaneously expounding that the problem lies not in eating them, but rather that people are not doing enough exercise to counter their ill effects. Following this line of thought, the individual ultimately is responsible or held guilty for their lifestyle and eating habits and of course, corporations use this to further promote technological solutions. For example, in Colombia, a powerful multinational promotes the use of electronic bracelets that, once placed on children, attempt to control their physical activity, and track their location and movements in real time.[14] They claim that they can exhaustively measure their exercise and then incentivize them to adopt healthier habits. This information bequeaths the data owners with great power, and once again reduces the causes of malnutrition to a single circumstance: in this case, the lack of physical activity.

All the above, far from questioning the current model or seeking to overhaul it, results in the victimization of those most affected by malnutrition. Instead, they are used as commercialized sources for multiple data or as consumers of new products,

9 Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. For more information, please visit: www.who.int/features/qa/malnutrition/en.

10 In 2017, EHNE Bizkaia, a trade union and member of La Via Campesina, developed a smartphone app that allows you to assess, via a list of indicators, the repercussions of your food shopping list on the environment. For more information, please visit: etxalde-app.elikaherria.eus.

11 For more information, please see: Asociación Ecología, Tecnología y Cultura en los Andes. "Nutrición y Agricultura Familiar". *Leisa revista de agroecologia* 30:4 (2014). Available in Spanish at: www.leisa-al.org/web/images/stories/revistapdf/vol30n4.pdf.

12 O'Neil, *Supra* Note 1.

13 World Economic Forum. I*nnovation with a Purpose: The role of technology innovation in accelerating food systems transformation*. 2018.

14 For more information, please visit: app.milo.com.co.

including technological ones. The main objective here is one of economic profitability, rather than improved access to nutritious food, going from retail outlets, as mentioned above, to public policies on food aid distribution.

In this respect, some countries such as Uruguay are designing public food aid policies in collaboration with large distribution chains. Instead of distributing basic food baskets, these programs provide electronic cards that can be used to purchase good in their stores. One of the arguments for implementing this initiative is that the card helps avoid social stigma and enables users to access food items in a 'normalized' environment. These cards, however, undeniably provide a significant source of data. Certainly, the information could feed into campaigns for better diets,[15] but it can also be utilized to evaluate what is being bought with public money, and, according to consumption patterns, decide whether particular groups of people 'deserve' to receive it. In some forums, there are already suggestions that people suffering from obesity and/or smokers be denied public health assistance, seeing as their 'bad habits', so it is said, have negative repercussions on a country's economy.[16]

CONCLUSION

Ongoing technological advances could be useful in improving nutrition, but this will not be the case if they are not made within a wider, systemic, and holistic vision, premised on human rights. At the moment, we can conclude that the proposals described in this article are instead geared towards increasing profit, corporate concentration and social control. They do not propose comprehensive solutions to address the root causes of malnutrition.

We need initiatives that are underpinned by other values; in other words, a broader outlook that prioritizes human rights, peoples' sovereignty and health, and most importantly, initiatives that link food to nutrition and social justice.[17]

Public policies that support and visibilize technologies and peoples' knowledge from different territories are essential: People who have labored towards sowing, harvesting and preserving food in all of its diversity, and continue to produce nutritious food today.

Clearly, big challenges lie ahead: technologies should be at the service of everyone's access to nutritious food. Not only do we need to refute the homogenization of diets and the harmful consequences on people's health, and nature as a whole, we also demand technologies and policies that recognize the need to withstand climate change and challenge the medicalization of malnutrition.

15 For example, in 2002 and 2003, in Montevideo, the Centre for Child Nutrition Studies (Centro de Estudios sobre Nutrición Infantil, CESNI) carried out a study based on debit cards that had been distributed in a low-income neighborhood of Montevideo, and the objective was to evaluate its inhabitants' eating habits.

16 In 2016, the EU and the European Institute for Science, Media and Democracy (EISMD), made up 25 universities and companies (such as Bayer and Google), launched an initiative to survey citizens' opinions regarding the extent to which certain consumers were guilty of some illnesses, questioning thus their access to public health services. For more information, please visit: www.eismd.eu/citizen-engagement-and-media-campaign-on-chronic-diseases-analysis-and-results-of-the-launch-of-the-beta-version-of-reisearch; El Pais, "Un puente entre ciudadanos, investigadores y políticas en salud". April 27, 2016. Available in Spanish at: elpais.com/elpais/2016/02/15/ciencia/1455552066_091496.html.

17 For more information on related recommendations, please see: Valente Schiek, Flavio Luiz. "The Corporate Capture Of Food And Nutrition Governance: A Threat To Human Rights And Peoples' Sovereignty". *Right to Food and Nutrition Watch* (2015): 15-20. Available at: www.righttofoodandnutrition.org.

IN BRIEF

Over the last few years, society has experienced considerable technological advances, which have led to improvements in some fields. In an era in which society is categorized by its relationship to the digital world (digital natives and immigrants), the same cannot be said for advances in the field of the right to adequate food and nutrition. This article presents examples of how some actors use technology to emphasize a reductionist vision and to strengthen the view that malnutrition is caused solely by dietary components and consumer behavior, without taking into account a series of factors that influence which products make it to the plate. And all this, whilst civil society organizations encourage a broad and holistic vision of nutrition. Proposals such as personalized diets based on DNA sequencing, electronic bracelets to monitor children's physical activity, and digital cards for access to food aid, have all turned persons – rights holders – into market-geared objects. Moreover, the real causes of malnutrition are still not being addressed. To counteract these outlooks, alternatives that see technology as an ally are urgently needed, thereby rendering more nutritional systems visible and generating ties to preserve and strengthen them. This is undoubtedly the challenge that lies ahead over the next few years.

KEY CONCEPTS

- → Technological advances have deepened inequality and malnutrition. They are at the service of profit, not human rights.
- → Two approaches to address malnutrition: a holistic, systemic approach vs. a reductionist, corporate approach.
- → Consumers as market-geared objects.
- → Human rights and rights holders, given the commodification of bodies.

KEY WORDS

- → Consumers
- → Nutrition
- → Health

Over the past few decades, public goods, such as water, education and health – the pillars of human rights – have increasingly been transformed into tradable commodities. Food, of course, has been traded for centuries, yet the recent failure in market regulation has led to its full commodification. As a result, it has contributed to the dispossession of productive resources. This affects peasant communities, damages the environment and changes our diets for the worse. The weak market regulatory framework has generated an ever-increasing gap between what is considered legal and what is actually sustainable and coherent with human rights.

Further to this, three intertwined dynamics – *dematerialization, digitalization and financialization* – are now altering the nature of both tradable goods and the markets where they are exchanged. Clearly, our food systems are at an important crossroads. There is now widespread recognition of the failure of the agro-industrial food system even by the World Economic Forum, and other actors who previously promoted the Green Revolution. Despite their recent damnations, these same organizations and actors now claim to have a new 'solution', known as the Fourth Industrial Revolution. This so-called 'innovative thinking' proposes a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres. This presents a new narrative which all of us must engage in to confront the threats that lie ahead.

In this context, this year's *Watch* explores the impacts of dematerialization, digitalization and financialization on our food systems. It discusses how these processes are altering the conception of the food market, and how food consumption habits within urban centers and beyond are being affected. It explores how targets of political action are shifting in the pursuit of food sovereignty, and interrogates how the fulfillment of the human right to adequate food and nutrition will be addressed. Read the *Watch*, reflect and send us your thoughts surrounding these new challenges and ways forward!

Visit the *Right to Food and Nutrition Watch*:
www.righttofoodandnutrition.org/watch

Follow us on Facebook
and Twitter at *#RtFNWatch*