CHAPTER 5

SOCIAL EQUITY, JUSTICE AND ETHICS: MISSING LINKS IN ECO-AGRI-FOOD SYSTEMS

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SUMMARY

Chapter 5 explores the impact of food systems on key aspects of social equity and justice, addressing particular ethical considerations related to hunger, sustainability, human rights, safety, marketing, trade, corporations, diets and animal welfare among others. The chapter identifies key components of food systems to promote equity from production to consumption, to food waste management. In an equitable food system, everyone has access to healthy food and the benefits and burdens of the food system are equitably distributed. These require policies that ensure poor people's access to land, natural resources, technologies, markets, rights and gender equality. The chapter concludes that social equity, justice and ethical considerations should be fundamental values of our food system and the Sustainable Development Goals (SDGs).

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5.0 KEY MESSAGES

- This chapter explores the ways our food systems impact key aspects of social equity and justice and addresses particular ethical dilemmas within this context. This chapter identifies key components of equitable food systems along with policies and strategies to promote more equitable food systems.
- Social equity, justice and ethical considerations should be fundamental values embedded in our food system from production to consumption.
- In order to be sustainable the global food system should be equitable and meet the needs of present and future generations in its products, services and outcomes, while ensuring profitability, environmental, social and economic equity, and justice.
- Ethical considerations are inherent to complex food systems, modern agriculture and food technologies. They range from issues related to sustainability, safety, marketing and trade, to dietary choices, the role of corporate power, treatment of animals and the use of crops for energy and feed in a world affected by hunger and malnutrition.
- In an equitable food system, all people have meaningful access to sufficient healthy and culturally appropriate food, and the benefits and burdens of the food system are equitably distributed.
- Equitable food systems require an adequate policy environment that improves poor people's access to land, water and other natural resources, ensures labour rights, provides access to new technologies; creates access to local and international markets; and invests in improving gender equality and women's education and status.
- Social equity is a critical component of most Sustainable Development Goals. The TEEBAgriFood Evaluation Framework provides a tool to collect and organize information and data on social equity related to food systems in order to assess progress towards the SDGs, considering all the components, institutions and policies of the food system, from production to processing, trade, distribution, and consumption, while also considering issues such as access and food waste management.

CHAPTER 5

SOCIAL EQUITY, JUSTICE AND ETHICS: MISSING LINKS IN ECO-AGRI-FOOD SYSTEMS

5.1 INTRODUCTION AND SCOPE

Social equity is a key aspect of the food system. It is one of the principal values underlying sustainable development, with all people and their quality of life being recognized as central (FAO 2014a).

In order to be sustainable, the food system must meet the needs of present and future generations with its products and services while ensuring profitability, environmental health and social and economic equity (FAO 2014b). Examining all aspects of the world's food systems, from production, to access, to trade and consumption to waste disposal, is critical in order to understand current performance and future sustainability.

Many international development plans such as the Sustainable Development Goals (SDGs), place importance on social equity and its relationship to poverty, hunger, obesity and inequality issues. At least 12 of the 17 SDGs contain indicators related to food systems and nutrition, and many of them reflect the importance of equitable food systems to the achievement of sustainable development.

TEEBAgriFood is designed to: i) provide a comprehensive economic evaluation of the eco-agri-food systems' complex, and ii) demonstrate that the economic environment in which farmers operate is distorted by significant externalities, both negative and positive, and a lack of awareness of dependency on natural, human and social capital. The TEEBAgriFood Framework offers a tool to assess the costs and benefits of social equity of different food systems considering all their components, institutions and policies, and their entire value chain (i.e. from production, processing, trade and distribution, to access and consumption, including food waste management). It thereby enables better informed decision-making in governments, businesses, farms and consumers' choices (see Chapter 7).

The overall objectives of this chapter include: i) identification of key social equity and justice issues, and their determinants and impacts, as they relate to the world's food systems, ii) identification of the main aspects of equitable food systems, and iii) a look at existing policies and strategies that promote more equitable food systems. **Figure 5.1** presents a conceptual illustration used by the chapter for the analysis of the main social equity and social justice issues related to the food system through the stages of production, processing distribution, access, retailing, marketing, consumption and waste management. The chapter includes a discussion of selected ethical considerations in the social equity, justice and agri-food systems' context and presents policy options that could contribute to the promotion of more equitable agri-food systems.

5.2 EQUITY, JUSTICE AND ETHICS IN FOOD SYSTEMS

Equity is a key element of social justice, one that includes the concept of equality and also encompasses fairness and inclusiveness. The concept of equity also takes into account resource distribution and access to opportunities and decision-making (FAO 2014a). There are many cases in which fairness refers primarily to protection of the weak and the vulnerable (Johnston 2011), yet concerns related to equity pervade all social groups, since it is a crosscutting issue.

As such, equity encompasses rights, control over resources, subjective views (people's views about their well-being), capabilities (what people are objectively able to be or to do) and access to primary goods. Technically speaking equity can be assessed from a comprehensive perspective by using multidimensional evaluative spaces (Sen 2017). This means that no single aspect or dimension can full capture the concept of equity and that considerations always involve interpersonal comparisons of welfare (Ravallion 2016).

Figure 5.1 The food system and related social equity, justice and ethics issues (Source: authors)

Experts tend to focus on or emphasize multidimensional aspects of equity, such as human rights and avoidance of deprivation (Dasgupta 2004; Sen 2009), protection of livelihoods or basic needs or capabilities (Sen 2017) or equality of opportunities (Roemer 1996; Roemer 1998). The question of the best informational space to evaluate equity brings up questions of power and privilege in terms of gender, race, place of birth, social milieu, poverty etc. (World Bank 2006). Different authors use different informational spaces to analyze inequality and poverty issues in food systems.

In the context of sustainable food and agriculture systems, equity concerns arise when looking at the comparable distribution of productive resources, opportunities of employment and social services (e.g. education, health and justice), gender and ethnic inclusiveness and inter-generational opportunity (FAO 2014a). Equity is related to equality in terms of allocation of resources and people's freedoms and responsibility in these allocations, including gender issues (MA 2005; Freeman 2007). Food security and food system sustainability are ethical goals, and are rooted in fundamental ethical principles such as respect for human dignity and justice.

Justice is the principle that covers the institutional dimensions of ethics, and the guiding reference to guarantee equality, fairness and equity between citizens within a society and between all societies. The concept of justice embraces moral values which are relevant to agriculture and food systems (European Communities 2008), including:

- Distributive Justice: which guarantees the right to food on an equitable and fair basis;
- Social Justice: which protects the most disadvantaged in society and equal opportunities, which guarantee fair trade at national and international levels;
- Intergenerational Justice: which safeguards the interests of future generations.

Respect for human dignity is a fundamental right and a universal ethical principle which entails fundamental human rights, such as the right to food, the need to respect individual freedom, self-determination and well-being (see Section 5.3).

5.3 THE RIGHT TO ADEQUATE FOOD, LIVELIHOODS AND OTHER HUMAN RIGHTS

Equitable food systems and ethical principles such as the right to food, to health, to livelihoods, to a healthy environment and the rights of future generations to inherit natural resources are overlapping and complementary (European Communities 2008). A rights-based approach towards equity and can help address questions of equitable food systems, particularly related to hunger, health, the use of land, water, natural resources, livelihoods, labour, and technology.

Both the Universal Declaration of Human Rights and the Universal Declaration on the Eradication of Hunger and Malnutrition state that every human being has the right to nutritious food that will lead to their full development physically and mentally. For the Special Rapporteur on the Right to Food, the right to food is the right to have regular, permanent and unrestricted access, either directly or by means of financial purchases, to quantitatively and qualitatively adequate and sufficient food corresponding to the cultural traditions of the people to which the consumer belongs (OHCHR n.d.).

In addition to food security, an equitable food system must also offer good conditions for decent livelihoods (Maxwell 1996). Billions of people do not have an adequate standard of living, particularly in rural communities in developing countries, among populations displaced due to environmental crises, and among vulnerable groups such as poor women and children. Over-exploitation of natural resources impairs resilience to shocks and economic crises, resulting in significant job and land losses, which add to negative impacts on livelihoods (FAO 2014b). Equitable food systems have a critical role in ensuring food security and providing sustainable livelihoods for vulnerable communities.

From a sustainability perspective, the right to food and to a healthy natural environment are inextricably related, since environmental degradation jeopardizes the planet's capacity to meet rising food needs (von Braun and Brown 2003) and economic development opportunities.

Economic development needs to be inextricably related to ethics and to be based on sustainability of natural resources and food security.

Ethical dimensions of the food system can be related to: policy design (e.g. malnutrition unsustainable use of natural resources, impacts on climate change, environmental health, biodiversity loss, etc.), producers' and consumers' choices, and the use of new technologies the food systems and any unexpected consequences that may arise.

As the nature of threats of the food system to health and the environment become more complex, uncertain and global in nature, the precautionary principle has been increasingly considered. This principle states that, in the case of serious or irreversible threats to the health of humans or the ecosystem, acknowledged scientific uncertainty should not be used as a reason to postpone preventive measures as provided for in Principle 15 of the Rio Declaration on Environment and Development (UN 1992).

5.4 SOCIAL EQUITY IN DIFFERENT ACTIVITIES OF THE FOOD SYSTEM

In an equitable food system, all people have meaningful access to sufficient healthy and culturally appropriate food, and the benefits and burdens of the food system are equitably distributed (Kessler and Chen 2015). **Table 5.1** shows how the concept of equitable food systems encompasses the effects of the production, processing, manufacturing, distribution, trade, retail, access, consumption of food and waste generation.

It is important to acknowledge that an equitable food production system is one that benefits people and groups that are disadvantaged or discriminated against, and it is vital in facilitating the reduction of poverty, through increasing food security as well as through providing broader economic development opportunities (von Braun and Brown 2003; Kessler and Chen 2015) and decreasing diet-related diseases.

Table 5.1 Conceptual matrix for the analysis of social equity and justice in eco-agri-food systems (Source: authors)

	Production processing	Trade commercialization	Distribution/Access consumption	Waste management
Human rights	Rights of poor agriculture/food workers The right to healthy environments Right to seed	Decent livelihoods	The right to food The right to health	The right to a healthy environment
Livelihoods	Wage level Capacity development		Access to healthy food Quality of life	
Ethical issues	Corporations- seeds patents New technologies Animal welfare Land grabbing	Code of ethics (Codex Alimentarius) Fair trade and ethical certifications	Food price Malnutrition Excessive meat consumption	Food waste Hazardous waste
Employment conditions in production Processing Distribution Retail	Child labour Forced labour Gender equality and equity Labour rights Occupational health	Gender equality Labour rights	Child labour/Forced labour Gender equality Labour rights Income equity	Occupational health
Production conditions	Farm size Monoculture vs. Agro-biodiversity Fair access to means of production Capacity building Indigenous knowledge	Subsidies	Food price Food diversity Indigenous diets Food sovereignty	Food losses and waste Capacity building
Environmental issues	Environmental justice Ecosystems services Biodiversity conservation	Environmental justice	Biodiversity Environmental health	Environmental justice Waste reduction and management
Health equity	Food safety Occupational safety/ exposure	Food safety standards labelling	Nutrition Diet-related diseases	Environmental health
Fair trade	Rights of producers Local economy	Responsible buyers Fair pricing Certification labelling	Fair salaries to access food	Waste reduction and management

5.5 FOOD PRODUCTION AND PROCESSING – EQUITY ISSUES

A growing population means ever-increasing food demand and corresponding pressure on global food systems to accelerate production. Equity in food production systems is then vital in assuring that this acceleration brings benefits and does not exclude the world's poor (von Braun and Brown 2003). Land and water systems in the major food producing regions of the world are at risk from intensive agricultural practices, which are degrading prime agricultural land, depleting non-renewable groundwater and competing with rapidly growing municipal and industrial uses. Competition for scarce land and water resources is at critical levels and is expected to intensify through 2030 (FAO 2011). Impacts of global warming and the acceleration of the global hydrological cycle will combine with resource scarcity to threaten the stability of the global food system in supplying even key staples to vulnerable populations.

5.5.1 Food demand, climate change and equity

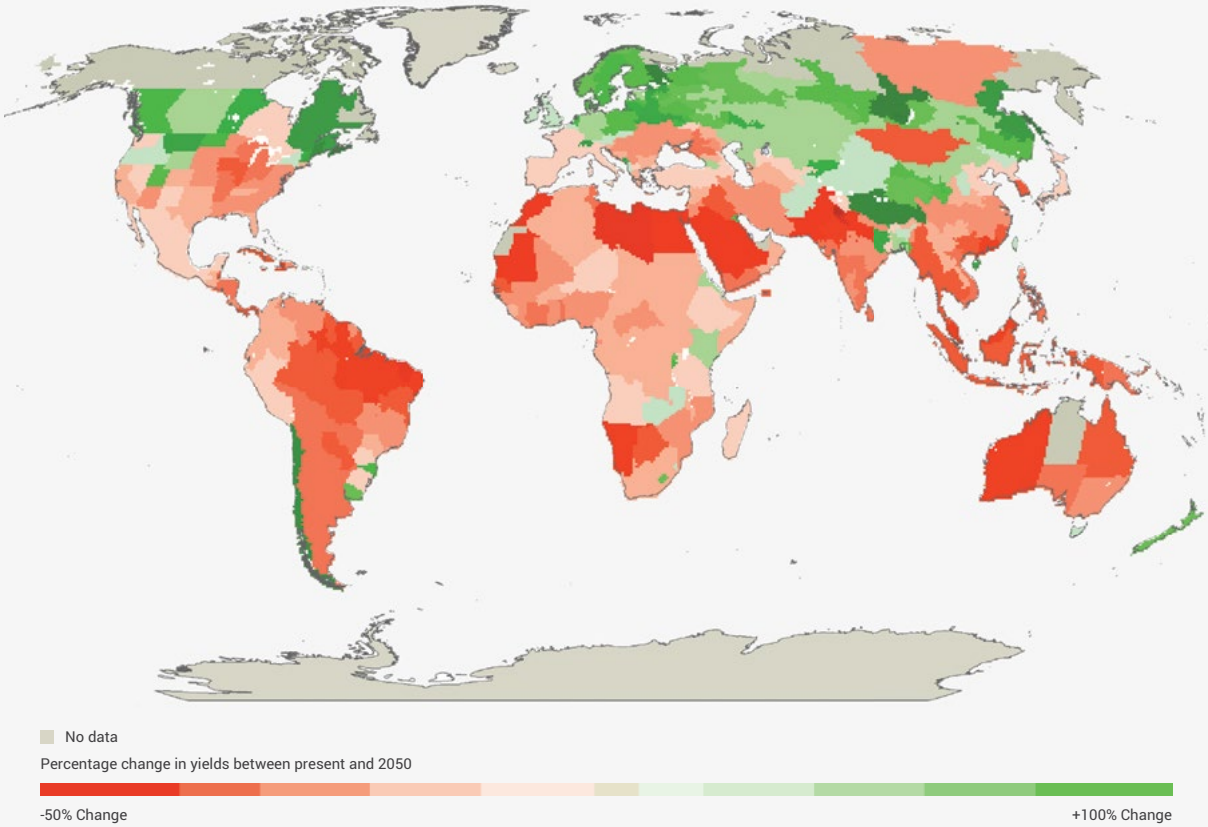
By 2030, food demand is estimated to be 35 per cent higher than today (see **Table 5.2**) with higher needs arising in cities as the world urbanizes. Developing countries are expected to shoulder much more of the production burden, although regional variations in productivity are significant. Overall projections, in the absence of climate change, suggest that the current production model could deliver the food needed for this higher rate of consumption (although not always, nor necessarily in the desired quality and diversity).

Climate change presents an added challenge, as illustrated by **Figure 5.2** The majority of the increase in food demand is likely to come from regions and countries where production increases will be more vulnerable to the impacts of climate change. With 1.5-2oC higher temperatures, median estimates suggest a 15 per cent reduction in global crop yields. **Table 5.2** shows that the largest food demand increases are projected for animal protein (meat, fish, and dairy products) in developing countries, which is also associated with high greenhouse gas emissions (Hedenus *et al.* 2014).

Table 5.2 Change in projected demand for food products between 2005/2007 and 2030 (per cent) (Source: derived from Alexandratos and Bruinesma 2012)

	World	Developed countries	Developing countries	Sub-Saharan Africa	Near East and North Africa	Latin America and the Caribbean	South Asia	East Asia and the Pacific
Cereals, food	28	6	34	94	42	27	37	14
Cereals, all uses	32	23	38	-	-	-	-	-
Roots and tubers	35	1	52	75	50	23	75	9
Sugar and sugar crops (raw sugar eq.)	38	3	52	107	47	23	65	42
Pulses, dry	36	10	39	103	30	19	24	9
Vegetable oils, oilseeds & products (oil eq.)	47	12	70	110	59	40	85	60
Meat (carcass weight)	45	16	69	109	90	50	189	59
Milk and dairy, excl. butter (fresh milk eq.)	40	13	66	82	61	41	76	71
Other foods (kcal)	34	13	45	79	50	36	63	32
Total foods (kcal)	35	9	43	93	48	31	50	26

Figure 5.2 Climate change is projected to reduce crop yields in regions where food demand is projected to increase most (Source: WRI 2013)



A report by the World Economic Forum (WEF 2017) illustrated various scenarios, all of which present challenges for social equality in light of climate change. Climate change will have a negative impact on the productive capacity of food systems and exacerbate inequalities among the population of a given country and between nations. Though poverty overall is decreasing, inequality within and between nations means that the benefits of global prosperity are not universally shared (WEF 2017). Information about the global structure of agriculture and nutrient production and its diversity is essential in order to improve understanding of national food production patterns, agricultural livelihoods and food chains, and the potential impact of climate change.

5.5.2 Access to the means of food production

Land tenure, land use regimes, farm size and policies related to these concepts are fundamental factors that affect the sustainability and equitability of food systems. Land reform is still needed in many countries; access to land by landless rural people, and other forms of land distribution or consolidation still need to be addressed. Who owns the land, how they use it, and who controls land transactions all significantly influence equity in rural areas. Ideally, land policies should prioritize the protection and realization of the right to food above the creation of a market for land rights (de Schutter 2010). This is relevant in many African countries where land is considered to be state-owned, and treated by governments as if is it were their own; in Latin America, where agrarian concentration is on the rise (Latin America remains the region with the highest level of land inequality, measured by land Gini); and in South Asia, where many populations are being driven off their land to make room for large palm oil plantations or special economic zones (de Schutter 2010).

When other influences on land productivity are accounted for, the degree of land inequality is found to be negatively related to agricultural land productivity. This suggests that the distribution of land within countries is not optimal and land markets are not functioning properly. Beyond agricultural productivity, land inequality has been shown to have a negative impact on other key aspects of economic development—education, institutions and financial development—and on poverty (Erickson and Vollrath 2007).

Box 5.1 Critical issues in Latin America: inequities in land distribution

World Bank (2007) indicates that, in Latin America, land tenure and administration remain plagued by inequities in land distribution despite a history of land reform that attempted to address such issues. Although many land reforms did not successfully address inequity, the government did put in place a tenure system and institutional structure that sets Latin America apart from other regions of the world. Latin America contains a significant area of land claimed by indigenous peoples, demarcated by a separate tenure category that mandates a land administration structure entirely different from the mainstream national structures.

The legal protection of access to productive resources, including in particular land and water, is vital for the rural poor. Small farmers or indigenous communities have frequently been driven off the land they depended on for their livelihoods by the establishment of large-scale plantations, particularly related to biofuel production, and by construction of dams, tourist resorts, or other large-scale infrastructure or industrial projects. A lack of priority given to smallholders and family farming in national policies has diminished access to financial resources for these groups, which make up a large section of the world population (Wolfenson 2013). Industrialized agriculture has contributed to the global environmental and employment crisis and disconnection from local realities (Wolfenson 2013).

Farm size and diversity of agricultural production vary substantially across regions and are key structural determinants of food and nutrient production (Herrero *et al.* 2017). Small and medium farms (≤50 ha) produce 51–77 per cent of nearly all commodities and nutrients (Herrero *et al.* 2017). Despite their importance to food and nutrient production, small farms receive a disproportionate share of investment and policy attention. In order to ensure that the poor have increasing access to nutritious and affordable food in light of climate change, public policy should focus not only on increasing agriculture productivity to lower food prices in domestic markets, but also on promoting food production diversity as farm sizes increase in order to maintain the production of diverse nutrients and viable, multifunctional, sustainable landscapes.

5.5.3 Gender equality and equity

Gender equality and gender equity are different concepts. Gender equality refers to equal participation of women and men in decision making, equal ability to exercise their human rights, to access and control resources and to reap the benefits of development, and equal opportunities in employment and in all other aspects of their livelihoods (FAO 2013). Gender equity is fairness of treatment for women and men, according to their respective needs (IFAD 2015).

Gender equity is not often a specific objective in agrarian legislation. Women are key players in the agricultural sector, yet compared to men they are considered to be less productive because they own fewer assets and have access to less land, fewer inputs, and fewer financial and extension services. FAO (2011) has identified key factors that contribute to the existence of a gender productivity gap , including: i) land ownership, or long-term user rights, ii) access to agricultural credit, iii) access to productive farm inputs (including fertilizers, pesticides, and farming tools), iv) access to timely labour, v) support from extension and other rural advisory services, vi) access to markets and market information, vii) access to productive land, and viii) access to weather and climate information. If women had equal access to opportunities and resources as men, they could increase their farm yields by 20-30 per cent, feeding an additional 150 million people (FAO 2011).

5.5.4 Environmental justice and eco-agri-food systems

Environmental justice (EJ) is not universally defined, and has different meanings to various communities and institutions. The definition also varies according to place, time, and perspective. It is often explained using examples of environmental injustices, focusing on the distribution of environmental risks (see **Box 5.2**).

According to the U.S. Environment Protection Agency (EPA 1992): “Environmental justice is the fair treatment and meaningful involvement of all people regardless of race, colour, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including a racial, ethnic, or a socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies”. People who live, work and play in most polluted environments in America are commonly low income and people of colour. The EPA established an Office of Environmental Equity to address this fact (EPA 1992).

Box 5.2 Pesticide spray drift: an example of environmental injustice

Pesticide spray drift, i.e. the airborne movement of agricultural pesticide residue into residential areas, may pose serious health concerns in farming communities, leading to neurodevelopmental, reproductive and carcinogenic impacts (Shelton *et al.* 2014) Children living in close proximity to fields or in agricultural households have been found to have higher exposure to unsafe levels of neuro-toxic pesticides than their non-agricultural counterparts. Pesticide drift accidents have affected many living in marginalized and vulnerable communities in agricultural areas worldwide. The fact that pesticide pollution and illnesses associated with it disproportionately affect the poor and the powerless raises questions of environmental justice (Harrison 2011).

Box 5.3 Equity, equality, and autonomy: paradigms in environmental justice

Ideas about the meaning of environmental justice (EJ) differ in terms of concepts of equity, equality and autonomy. Equity and equality have been at the heart of most institutions' and many organizations' definitions of EJ. Some activists consider that EJ will be achieved through equitable distribution of environmental benefits, protection, and hazards, and equal treatment of communities (Peña 2003).

Equity, equality and autonomy have been defined in the context of environmental justice (Agyeman *et al.* 2003).

- Equity refers to freedom from favouritism when referring to a system of law; for instance, in the fulfilment of standards regarding environmental health. For example, the EPA established standards of acceptable air quality and the air quality for all communities should meet the standards.
- Equality refers to the same treatment and influence of all communities regarding environmental health. For example: Polluting industries should be distributed equally among the population and regions; thus, their air quality should be equal.
- Autonomy refers to the right of communities to be independent and self-governing when it comes to decisions that would affect environmental health. For example, communities should have a right to govern what type of air quality standards or how many polluting industries they want for their community beyond the minimum established by national / international norms.

EJ should not only be thought of in terms of the differentiated impacts of environmental pollution (brown issues) on communities and people, but also in terms of natural resource management (green issues). The pressure that demand for food worldwide is putting on natural resources is accelerating deforestation and land degradation, and leading to marginalization of people through conflicts over land, forests, water bodies and extractives worldwide. **Box 5.4** offers an example illustrating the impact that increased agriculture production has had on deforestation, GHG emissions and land conflicts in Brazil.

Very often, the people most affected by deforestation are local populations and indigenous people that directly depend upon forest and soil resources for their traditional livelihoods (e.g. foraging communities). Unclear property rights and a lack of capacity to enforce natural resource preservation and management can lead to unsustainable use of land resources, especially when local populations do not have a voice to enact laws or enforce them.

Giving a voice to environmental groups and communities directly affected by such practices, like deforestation, is key in order to quickly arrive at compromises and incentives structures that allow for economic growth, food security and environmental justice.

The experience described in **Box 5.4** in Brazil is also common in other countries, and shows that large agri-food companies have a key role to play in the management of natural resources. Livestock (beef) and soy production are one of the main sources of deforestation and land degradation in Brazil, so producers at all scales must be involved in the related solutions.

Making agriculture production more sustainable is ever more imperative as food demand increases. The government of Brazil has established the largest incentive program worldwide (measured by volume of resources) for "greening" the agriculture sector ("Programa de Agricultura de Baixo Carbono – Programa ABC"), and the private sector has enacted related a "soy moratorium" with a promise not to buy soy from deforested lands. These measures are working and GHG emissions per head of cattle sold have been steadily decreasing and deforestation has dropped significantly in the past decade since the moratorium.

Box 5.4 Agriculture production, deforestation and land conflicts in Brazil

Brazil faces major challenges as it simultaneously pursues agricultural growth, environmental protection and sustainable development (World Bank 2010). Agriculture development and road expansion have been causing a steady increase in deforestation, as well as uproar in the international community as GHG emissions rise and local indigenous populations are pushed out of their lands. Brazil continues to be one of the worst offenders in terms of death due to land conflicts (U.S. Department of State 2015).

Brazil's forests and the Cerrado region represent an enormous carbon stock. The Amazon region, a reservoir of about 47 billion tons of carbon, sequesters more than five times the amount of carbon emitted globally each year – a huge benefit

for the rest of the world.

The conversion of forestland to agricultural uses is likely to continue in areas such as the Cerrado region, which contains very large areas with untapped agricultural and forestry potential. With the continuing expansion of the country's road network, these areas are likely to become more accessible and thus more attractive to livestock investors increasing the risks of land conflicts with indigenous communities.

Food Justice

The concept of food justice is related to the environmental justice movement; it focuses on issues at the neighbourhood level, relates to the sustainable agriculture movement and incorporates issues of equity and social justice (Alkon and Norgaard 2009). Food justice accounts for racially stratified access to environmental benefits and draws attention to how that issue relates to the sustainable agriculture movement's processes of food production and consumption (Alkon and Norgaard 2009). The food justice concept has been used as a bridge between scholars and activists to connect the concepts of environmental justice, sustainable agriculture and food insecurity.

5.5.5 Ecosystems services and social equity

Ecosystems such as forests, wetlands, agricultural land and freshwater provide a variety of services[1] that are economically valuable.

Arranging payments for the benefits provided by ecosystems is an innovative approach to conservation, recognizing their value and ensuring that the benefits of these natural functions continue in future.

Payment for Ecosystem Services (PES) are arrangements through which the beneficiaries of environmental services, from watershed protection and forest conservation to carbon sequestration, reward those whose lands provide these services with subsidies or market payments. In PES schemes, ecosystem services payments differ depending on the size of the land area put under conservation (on average, a smaller piece of land has a higher price per hectare) thus aiming to ensure a fairer distribution of funds between communities or wealthy landowners, and families (who tend to own smaller parcels, and for whom it may be more difficult to set aside land for conservation). PES schemes have also provided incentives for small landholders to group together in order to obtain economies of scale and gain eligibility for payment once conservation measures are adopted. Programs such as the Costa Rican PES scheme have matured over the years, establishing differential payments for activities that result in varying degrees of environmental service provisioning. While these activities might result in efficiency gains, resulting funds are not necessarily distributed equitably (Pagiola *et al.* 2004), urging the need to adopt fairness criteria into PES design (see more in Section 5.10.5).

5.5.6 Inequities of food-chain workers' health and occupational health

The International Labour Organization (ILO) considers the agricultural sector to be one of the most hazardous to health worldwide (ILO 2009). Millions of injuries occur to agricultural workers annually, at least 170,000 of them fatal (Cole 2006). Agricultural production facilities and fisheries have characteristics that are risky for safety and health including: exposure to the weather, close contact with animals and plants, extensive use of agro-chemical and biological products, lengthy hours and use of hazardous tools and large machinery.

Health hazards in agriculture range from relatively simple conditions like heat exhaustion to complex diseases like cancer. Exact data on levels of exposure and associated disease prevalence (or health effects) related

1 Ecosystem services are defined by the Common International Classification of Ecosystem Services (CICES) as the contributions that ecosystems make to human well-being, and include provisioning, regulating and cultural services (EEA 2018).

to pesticides in the developing world are limited. Health and injury burdens depend on the type of farming activity, the type of worker, geographic location and inequities in occupational health services.

Migrant and seasonal workers in the food system constitute a particularly marginalized and underserved population with many unmet socio-economic and health care needs worldwide. Occupational hazards, poverty, substandard living conditions, migrancy, and language and cultural barriers contribute to seasonal agriculture workers' health problems and inequities in health care (Hansen and Donohoe 2003). In order to address the health care needs of workers in the food system, there is a need for stronger public health infrastructure, more data on specific health conditions in migrant and seasonal workers and improvements in education among workers and health care providers.

5.5.7 Labour rights

The agriculture and food sectors account for more than one-third of the world's labour force, and act as the second largest source of employment and the most important source of employment for women in many countries around the world (ILO 2018). This field faces some of the greatest challenges in working conditions and wages because of socioeconomic and historical trends. New factors now compound this issue, for example, the rise of informal employment, expansion of corporate regimes, and creation of neoliberal policies in the food system. These issues have disproportionate effects on the most vulnerable groups of workers including children, women, and other marginalized groups.

Labour rights are a range of rights enshrined in the ILO's Declaration on Fundamental Principles and Rights at Work (ILO 1998). Labour rights apply to food and beverage enterprises of all sizes and types (primary production, processing and marketing), as well as various types of ownership structures including cooperatives, single-family businesses, collectives, community-owned land trusts, tribal associations, and corporations, including both full and part-time producers, or business owners (FAO 2014b). Labour rights apply to all partners involved in the day-to-day management of a business operation, as well as all people employed whether full or part time, year round or seasonal (FAO 2014b).

Major worker issues occur across the food system, including child labour, forced labour, human trafficking, occupational health and safety malpractices, excessive working hours, gender-based harassment and discrimination, low and withheld wages and lack of legal status for immigrants. These issues can occur at any point in the chain including raw commodity production, both low-and high-value processing, wholesale/retail work or work in restaurants. Corporate food regimes can compound problems with low and irregular wages and lack of social protections through exclusion of workers from labour laws (Anderson and Athreya 2015).

Child Labour

Child labour and forced labour in food value chains pose major equity and ethical issues. ILO (2017a) defines child labour as work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development. It refers to work that is mentally, physically, socially or morally dangerous and harmful to children, and interferes with their schooling by depriving them of the opportunity to attend school, obliging them to leave school prematurely or requiring them to attempt to combine school attendance with excessively long and heavy work. Over 70 per cent of all child labour occurs in the agriculture sector, and there are an estimated 100 million child labourers engaged in farming, livestock, forestry, fishing or aquaculture, often working long hours and facing occupational hazards and higher levels of risk than adult workers (Eynon *et al.* 2017).

According to an annual report produced by the U.S. Department of Labor (U.S. Department of Labor 2014), 126 different types of goods, including sugarcane, coffee, fish, rice, cocoa, alcoholic beverages and palm oil, are produced globally with the aid of child labour. Child labour not only violates children's rights by endangering health and interfering with education, it also creates an obstacle to sustainable development and food security.

Addressing child labour requires focus on its root causes, such as rural poverty and lack of social protection, and demands a look at food security among other issues (Eynon *et al.* 2017).

Inequity along the food chain: food manufacturing and processing

Workers across the food chain are often faced with low wages, dangerous working conditions and exploitation. For example, nine of the ten lowest paying jobs in the U.S. are in the food sector (U.S. Bureau of Labor Statistics 2016). While a number of factors contribute to this phenomenon, **Box 5.5** looks at how three factors in particular – immigration status, gender and race – affect wages in the food sector and processing plants in the U.S. from a legal and justice perspective.

Box 5.5 Main factors affecting lower wages in U.S. food sector and processing plants from a legal and justice perspective

Lee (2017) identifies three key factors contributing to lower wages in the U.S.: immigration status, gender and race. Studies from a number of different fields show an increased concentration of new Latino migrants in meatpacking communities particularly in the rural south. Many of the major processing plants in the U.S. are based in rural communities in states with weak labour law protections, which affects wages.

Gender also informs the type and severity of harms experienced by food workers. Although women tend to fare worse than men across industries, they fare particularly poorly in restaurant and farm industries. First, in the restaurant industry, women who work as servers routinely experience sexual harassment. Because of restaurants' antiquated tip-driven wage system, servers must please both their employers and customers. And while some servers at high-end restaurants might be able to rebuke harassing customers without imperilling their economic security, most servers cannot do so without a significant economic cost. Female farm workers have lower wages and regularly confront the threat of assault. The remote and rural nature of farms as workplaces erects a geographic barrier that makes policing these types of harms challenging.

Third, race continues to define working conditions and wages for many food workers. Existing scholarship has documented how race has figured into major shifts in farming policy and practices including race-based justifications to dispossess Native Americans of tribal lands during the 18th century (Saxton 1990; Walker 2007; Berger 2009) as well as the exclusion of farmworkers from New Deal protections, many of whom were the descendants of freed slaves (Linder 1987; Forbath 2001; Perea 2011). Less well-known is how a tip-based wage system exacerbates difficult racial dynamics within the restaurant industry. Under a tip-based wage system, workers can earn and keep whatever tips they may earn. But labour laws interpret these laws strictly, which means that in most cases, only those who work in the "front of the house" as servers, bartenders, and hosts are entitled to tips. Those who work in the "back of the house"—like cooks, dishwashers, and bussers—are excluded from this system. This wage differential exacerbates the racial dynamics that characterize many restaurants in which native-born whites work in the front of the house while immigrants, often from Latin and South America but also from Africa, the Caribbean, and Asia, remain in the back.

5.6 DISTRIBUTION AND ACCESS – EQUITY ISSUES

5.6.1 Poverty

Poverty is pernicious not only for its incidence but also for its depth (Ravallion 2016). In most regions of the world, poverty rates in rural areas are well above those in urban areas (See **Figure 5.3**). Problems in food distribution have especially negative impacts on children and the vulnerable. Approximately 23.2 per cent of children under five qualified as stunted in 2015, which represents a total of 156 million children in the world. The percentage of children under five who are wasted or severely wasted is 7.4 per cent and 2.5 per cent respectively. On the other hand, 42 million children under five are currently overweight (UNICEF 2017). More dramatically, perhaps, is the estimation that 45 per cent of the deaths of children under age five are linked to malnutrition (Black *et al.* 2013). Although poverty overall decreased from 44 per cent in 1990 to less than 15 per cent in 2012 (as defined by surviving on US$ 1.90 per day), there are many forms of malnutrition still prevalent in the world that are important from an equity perspective.

Incomes of the poorest people - most of them in rural areas and dependent upon farming for their livelihoods - will need to increase by about 4.5 per cent per year to meet the target of only 9 per cent of the world population in poverty by 2020 and the 3 per cent target by 2030 (Ravallion 2013; Yoshida *et al.* 2014). From 2000 to 2010, agricultural total factor productivity growth, a key driver of agricultural income gain, was about 1 per cent per year (Fugile *et al.* 2012) in the poorest regions, particularly in Sub-Saharan Africa. Continuation of this rate, even with projected migration rates, which would increase agricultural labour productivity, will likely leave real income gains below the needed 4.5 per cent per year, unless other, non-agricultural employment opportunities are provided in the rural space.

Raising the incomes of the rural poor is possible. The experience of Brazil shows how a country can go from a food insecure, net food importing country to a net food exporter with a drastic reduction in poverty and hunger. Agricultural productivity in Brazil has increased not only for the largest commercial farmers, but also for smaller family farmers thanks to macroeconomic policies that support the agricultural industry as a whole, along with specific agricultural policies targeting family farmers (FAO 2014c).

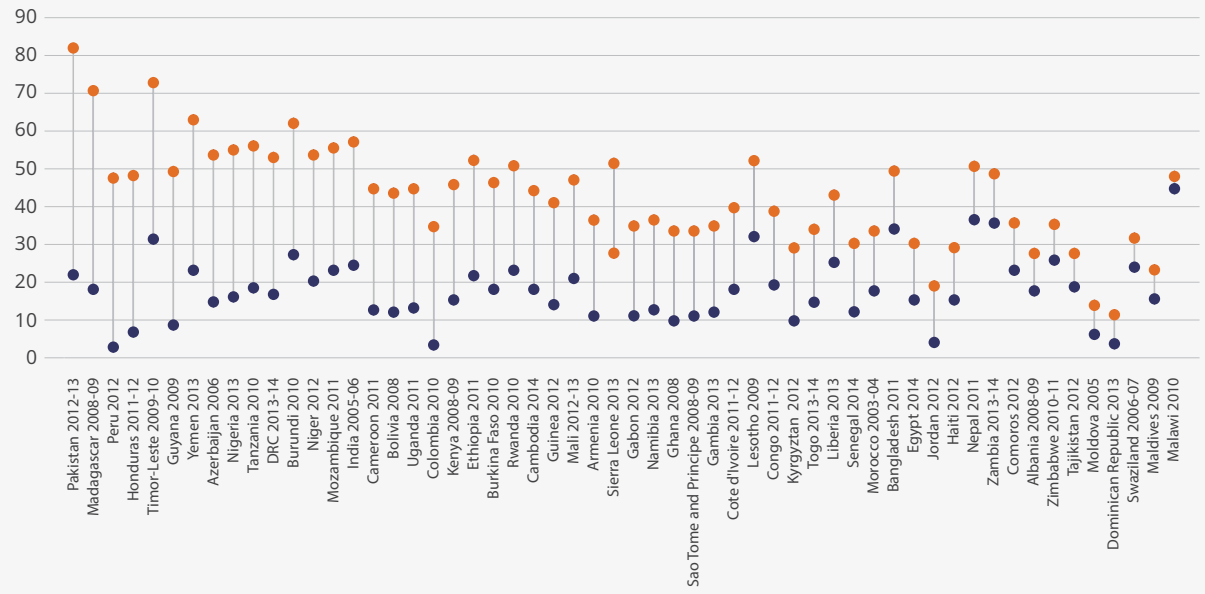
Figure 5.3 Trends in rural and urban extreme poverty by region (Source: adapted from IFAD 2016)

5.6.2 Economic and distributive inequality

World economic inequality, as measured by the Gini index of household income inequality, has increased from 38.5 per cent in the early 1990s to 41.5 per cent in the late 2000s (UNDP 2013). Despite the global financial crisis, the number of undernourished people in developing countries declined from over 23 per cent to roughly 13 per cent (FAO 2017). However, undernourishment trends are unequally distributed in the world with Sub-Saharan Africa and the Caribbean having 23.2 per cent and 19.8 per cent of the total world incidence of undernourished populations, respectively. There are also wide variations in stunting within countries, with many sub-national regions having stunting rates up to three times higher than the region with the lowest stunting rate (see **Figure 5.4**). One of the most important drivers is mother's age at birth. For instance, in Ghana and Uganda, 20 per cent more five-year-old children are stunted if born to women under 18 (IFPRI 2016). In addition, according to the FAO (2013), there are still two billion people in the world who suffer from one or more micronutrient (vitamins and minerals) deficiencies.

The food system has an impact on economic inequality and not only in developing countries. In the U.S., only 8 per cent of farmers on large farms (those with sales of US$ 250,000 or more per year) can live on farm income alone. The primary rights of American farmers are being neglected, as shown by: i) the failure of the U.S. food system to provide remuneration for farmers' labour that is enough to satisfy their family needs (including health care and social security), and ii) the failure to benefit from scientific progress and its applications (Anderson 2008). This happens in part because farming in the U.S. has not been able to generate many rural jobs because public policy and technology have benefited capital-intensive food systems (NRC 2002).

Figure 5.4 Stunting prevalence by subnational region (Source: adapted from IFPRI 2016)



According to FAO (2018a), global food prices have generally fallen over the last five years as a result of an increase in food supply (though a recent rise in food prices counters the general trend), as shown in **Figure 5.5** and global hunger.

5.6.3 Food prices and inequity

Food prices are important contributors to the overall picture of nutrition and health status. Food prices affect diets and diet choices, which are in turn the number one risk factor for the global burden of disease (IFPRI 2016). The poorest individuals spend a larger share of their income on food (urban poor can spend more of 50 per cent of their budget on food (World Bank and IMF 2012).

has fallen, from affecting around 19 per cent of the overall population in the early 1990s to below 11 per cent of the current population. The traditional link between food prices and poverty depends on the context. Indeed, rapid urbanization and population growth mean that food insecurity and malnutrition are increasingly becoming urban problems (IFPRI 2017). In addition, it is important to note that access to food has been much limited in areas with civil conflicts and areas suffering drought conditions in East Africa.

A good index of persistent of hunger due to higher food prices, seen as an extreme measure of inequity, can be revealed by the number of countries that require external assistance for food. There are currently 37 such countries, 28 of them in Africa (FAO 2017). However, FAO's composite food index should not be seen with extreme optimism because the markets for some foods such as sugar and oils have varied more than others, such as meat (their respective standard deviations during 2000-2017 were 52.6, 34.2 and 15.4, suggesting that food prices of sugar and oils have experienced more volatility than those of meat, as shown in **Figure 5.6**, whose consumption remains a key nutritional challenge for developing countries).

There is also great variability of food prices between cities in the same region (see **Figure 5.7**), which ultimately affects people's dietary choice and eventually health inequities.

The urban poor are particularly sensitive to food prices. As urban populations increase, food insecurity and malnutrition are increasingly becoming urban problems in all regions of the world (IFPRI 2017).

The minimum wage can be set to cover the minimum needs of a worker and his family, taking into account the economic and social conditions of the countries. The concept of Basic Food Basket (BFB) covers the goods needed to meet the nutritional needs of the population and is used to determine each country's extreme poverty line. Therefore, linking BFB to the minimum wage can help illustrate the degree of vulnerability of the poorest households in terms of food and nutritional security. For example, **Box 5.6** shows the relationship between the cost of the family BFB and the minimum wage for a sample of countries in Latin America.

Figure 5.5 Food Price Index (Source: FAO 2018a)

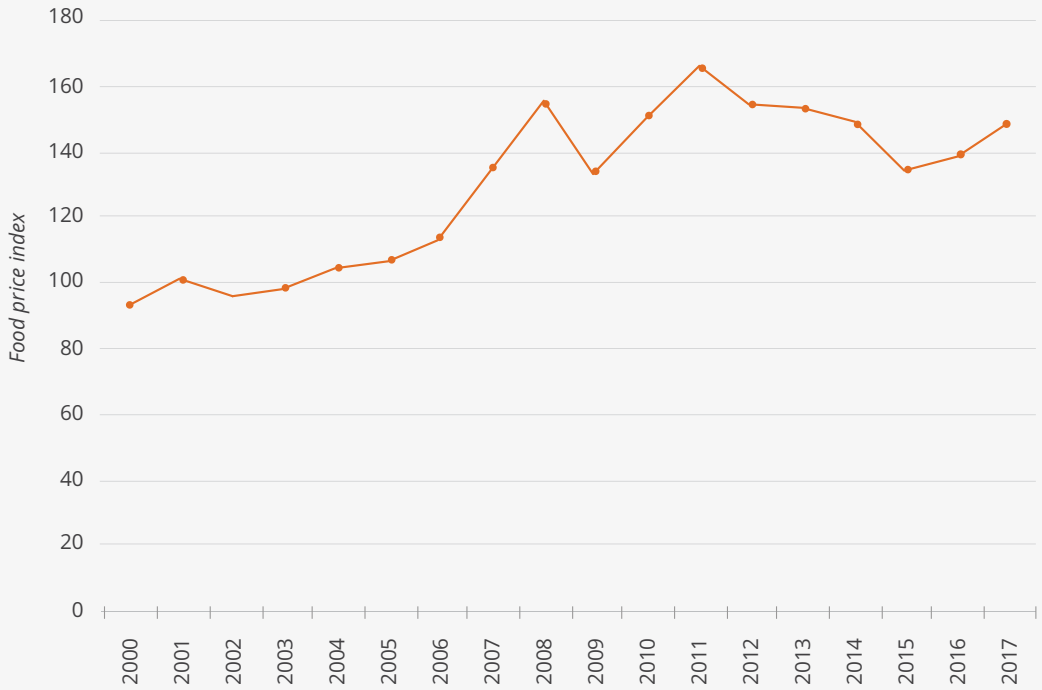


Figure 5.6 Food Commodity Price Indices (Source: FAO 2018a)

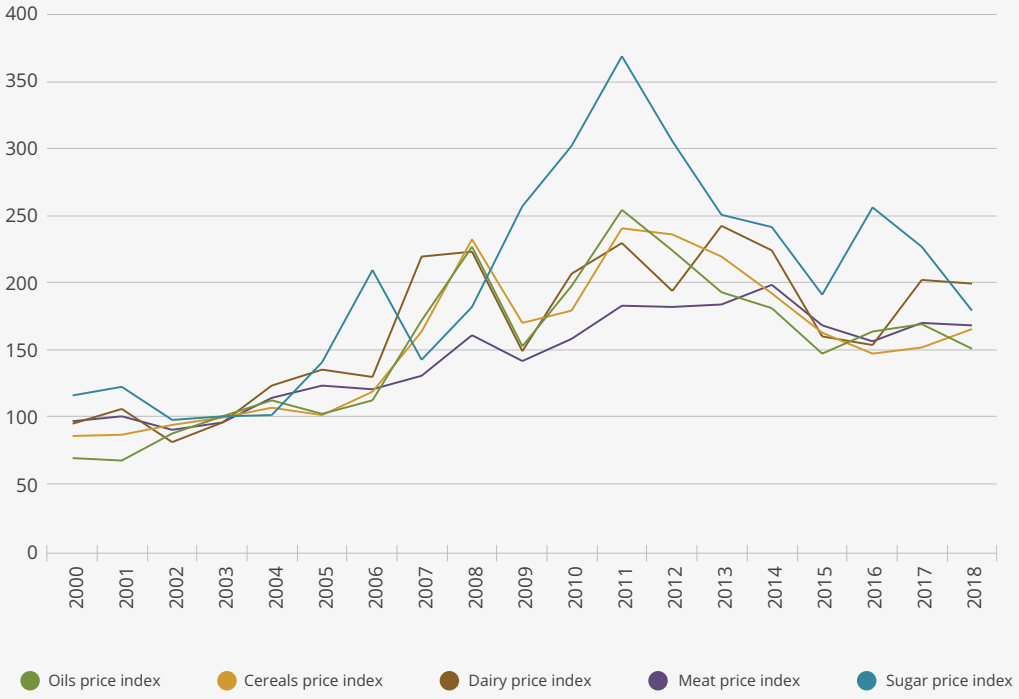
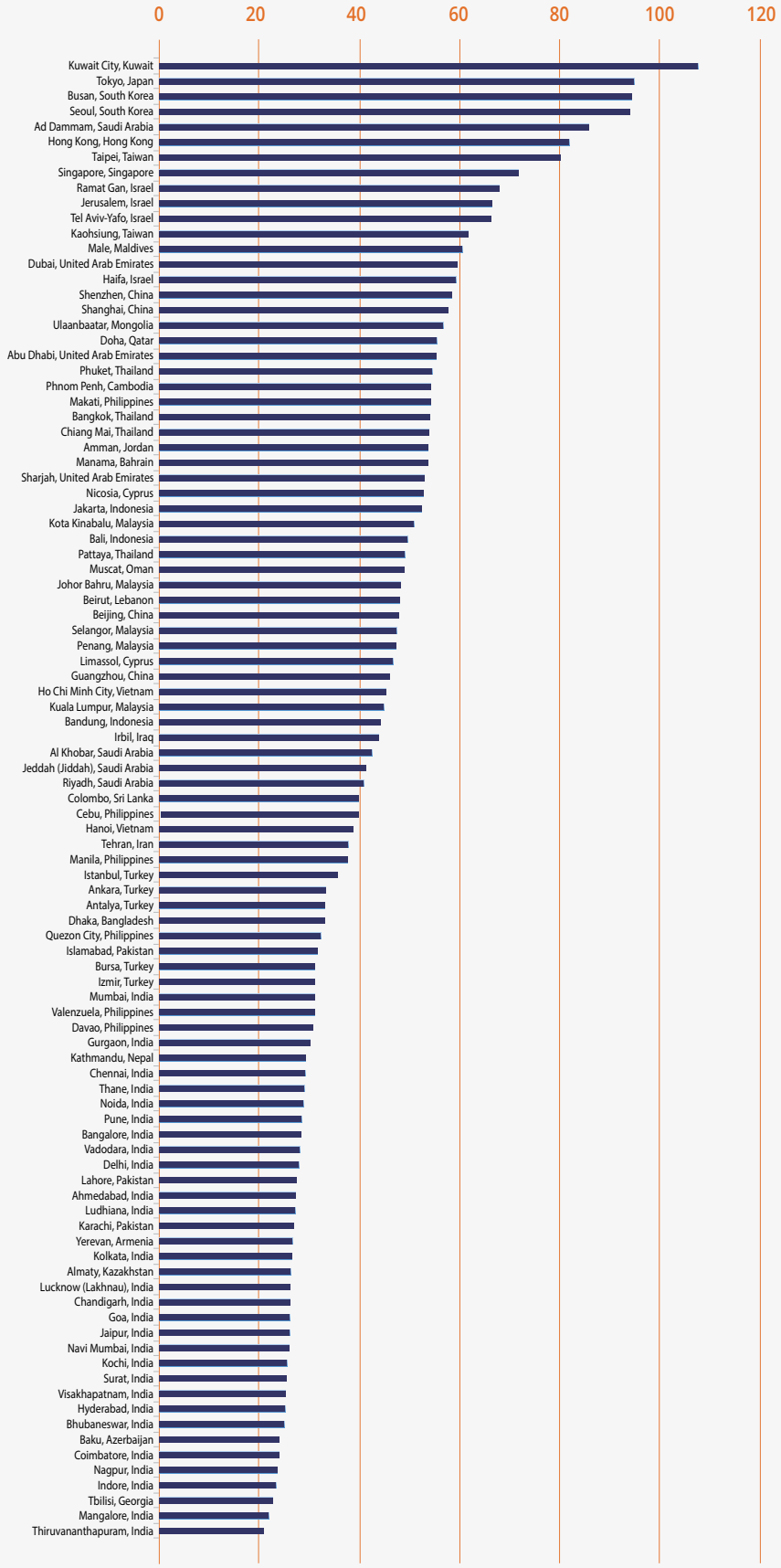


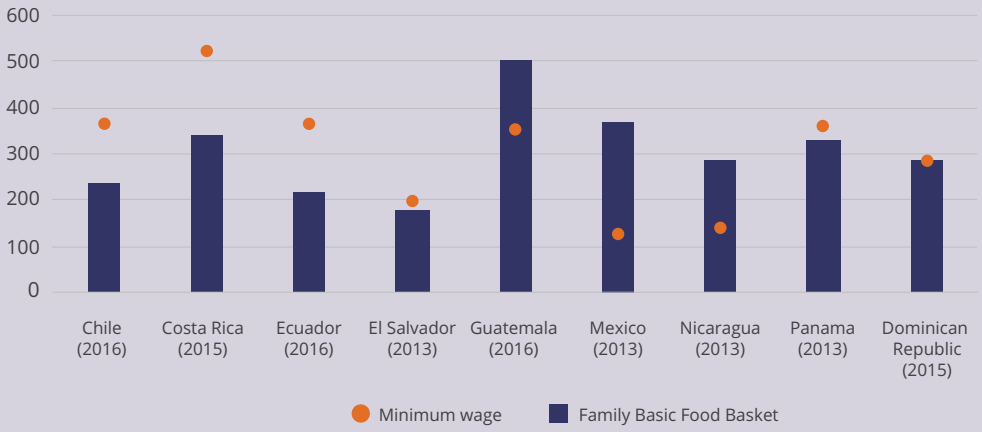
Figure 5.7 Cost of living in Asian cities (Source: Numbeo 2018)



Box 5.6 The relationship between food prices, minimum wage and vulnerability in Latin America

A sample of nine countries in Latin America were analyzed to assess whether minimum wage could cover the cost of a family BFB. Firstly, the variability between countries, in terms of both minimum wage and BFB, was significant. Minimum wage ranged from 129 to 523 between Mexico and Costa Rica, respectively, while the difference between cost of family BFB ranged from 174 to 499 in El Salvador and Guatemala, respectively. Secondly, the results themselves were mixed. Three countries (Guatemala, Mexico and Nicaragua) are all unable to cover the cost of a family BFB with minimum wage; three countries (El Salvador, Panama and Dominican Republic) were all barely able to cover the costs; and although the remaining three countries (Chile, Costa Rica and Ecuador) all earned sufficient amounts to cover the costs, it is still worth pointing out that more than half of their earnings were spent on food alone. Lastly, it should be noted that not all the basic needs of a family are included within the cost of a FBB; therefore, small variations in the price may put at risk the food security of the family group.

Figure 5.8 Basic Food Basket and minimum wage in a sample of countries in Latin America (Source: personal communication, FAO Regional Office for Latin America and the Caribbean, based on country data and ILOSTAT)



As global incomes rise and households with rising incomes spend a smaller share of that income on food, their patterns of food consumption tend to vary less even if food prices spike. With less downward adjustment of demand, the supply side (through production, stocks and trade) will need to adjust more quickly to production shocks in order to reduce overall price volatility and reduce the magnitude and frequency of price spikes over time. Current trade and social protection policies leave many poor people vulnerable to adverse nutritional consequences of food price shocks. The logistical capacity to transport food from areas of production to areas of demand is stretched in many food insecure locations. In addition, with increased population density, there is increased risk of the spread of livestock diseases.

Food price volatility and unexpected large swings in food prices creates hardship for low-income food consumers who spend most of their budget on food, and for poor farmers who depend on agriculture for their income. Governments have acted to try to safeguard the most vulnerable against such swings, but often with unintended consequences. To ensure the progressiveness of food support policies, targeting poor communities and families is key.

5.6.4 Food access, health and nutrition

Globally and within countries there are large inequities in relation to the access to, and the affordability of, nutritious and healthy foods. The food system plays a lead role in poor nutrition outcomes globally, which are linked to morbidity, premature mortality, high health care costs and lost productivity. While significant progress has been made on the Millennium Development Goal (MDG) for provision of adequate amounts of available dietary energy, progress on the MDGs for undernutrition (underweight) and stunting has lagged. Eliminating undernutrition within a generation will be challenging. If current trends continue, an estimated 450 million children will be affected by stunting by 2030 (De Onis and Branca 2016).

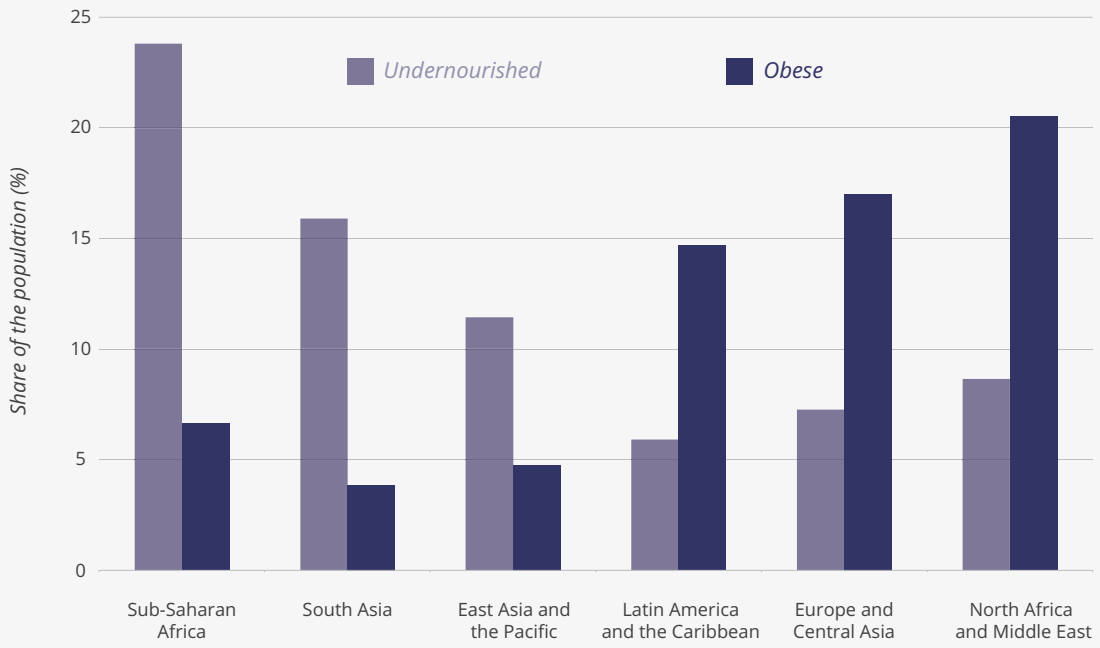
Obesity and inequities

Obesity has increased to the extent that the number of overweight people now exceeds the number of underweight people worldwide. Almost 30 per cent of the world's population, or 2.1 billion people, are overweight or obese, 62 per cent of whom live in developing countries (Ng *et al.* 2004) thus illustrating an important inequity.

Obesity accounts for a growing level and share of worldwide diabetes, heart disease, and certain cancers. The number of overweight children is expected to double by 2030. Driven primarily by increasing production of processed, affordable, and effectively marketed food (Swinburn *et al.* 2011), the global food system is falling short on – and arguably actively driving – rising obesity and related poor health outcomes. Due to established health implications and rapid increase in prevalence, obesity is now a recognized major global health and health equity challenge, and no national success stories have yet been reported (Ng *et al.* 2014). Over the past twenty years, a global overweight/obesity epidemic has emerged, including in low- and middle-income countries, resulting in a triple burden of undernutrition, micronutrient deficiency, and overweight/obesity. There is significant variation by region, where some have very high rates of chronic undernutrition (stunting) and low rates of obesity, while for other regions the opposite is true (see **Figure 5.9**).

There is a close link between food access and food security and nutrition. Whereas the relatively rich buy their food from supermarkets, many of the poor still rely on the informal sector where access to electricity for long-term refrigeration can sometimes be difficult. For instance, in many African cities, the urban poor buy most of their eggs, fish, meat and milk from informal markets. In countries such as Cote d'Ivoire, Kenya, Mali and Uganda, 80-90 per cent of raw milk is purchased from vendors or small-scale retailers whereas 90 per cent of households in the relatively richer cities of Cape Town and Johannesburg in South Africa buy their milk from supermarkets (IFPRI 2017).

Figure 5.9 Undernourishment and obesity rates vary significantly by region (Source: adapted from World Bank 2015)



Box 5.7 Food access, consumption and lifestyle in transition economies

Food access is a fundamental equity issue. Evidence from South East Europe (SEE) and Eastern Europe, the Caucasus and Central Asia (EECCA) revealed that their food systems, highly specialized during the Soviet and Yugoslav legacies, changed dramatically during the political changes of the 1990s. The previous systems included large-scale farms, 'dachas' (plots of family land) and an overall state-run system that was highly centralized. Dismantling of the system of state-controlled agricultural production led to changes in ownership and access, with profound effects on people's health including the intensification of fertilizers and pesticides and changes in diets, places of food purchase and in attitudes to food labelling. Calorie intake decreased in most of EECCA countries during the recession of the mid-to late 1990s, but has recovered since then (Hak *et al.* 2013).

5.6.5 Health inequities

Health inequities associated with the food system are reflected in disproportionate rates of malnutrition, obesity and diet-related disease such as type 2 diabetes and cardiovascular disease among the poor. Health inequities are also related to occupational health, as seen through exposure to chemicals in rural agricultural communities.

Health inequities related to nutrition

Of the top 20 risk factors for health in terms of attributable mortality, 10 are related to nutrition (including four of the top six). While under-nutrition and micronutrient deficiencies continue to play an important role in morbidity and mortality in low-income countries, the largest nutrition-related burden worldwide now comes from energy-rich and often nutrient-poor diets, and by an excess consumption of foods high in salt, sugar and fat, in countries at all levels of income (Popkin *et al.* 2012). The most dramatic manifestation of this trend is the current obesity epidemic. Since 1980, obesity rates have doubled or tripled in many countries worldwide, and in more than half of OECD countries over 50 per cent of the population is currently overweight (WHO 2017).

Different dimensions of poor nutrition, as well as the burden of disease associated with them, are distributed unevenly within and between countries. Undernutrition and micronutrient deficiencies remain heavily concentrated in poor countries and affect predominantly (but not exclusively) the most disadvantaged groups in those countries, i.e. those who cannot afford nutritious foods and diets, or experience other access barriers.

Conversely, those forms of malnutrition linked to excess intake of calories of poor nutritional quality, often leading to obesity, have been spreading faster in high-income countries. Within countries, the distribution of obesity in different socioeconomic groups tends to follow different patterns depending on countries' income and level of development.

Obesity is especially prevalent in higher socioeconomic groups, particularly in men, in lower-income countries. The pattern is generally reversed in higher-income countries, where it is women of low socioeconomic condition who are most likely to be obese (Devaux and Sassi 2013).

In Europe, social disparities in overweight and obese populations are generally associated with national income. Roskam *et al.* 2010 found that a EUR 10,000 increase in per capita GDP corresponded to a three per cent increase in the rate of being overweight and obese among less educated men, and a four per cent decrease for more educated men, while no associations with GDP were observed for women. Obesity in women, especially during pregnancy, contributes to the health risks of their children and this amplifies health inequities across generations (Robertson *et al.* 2007; Loring and Robertson 2014).

Obesity and other conditions that are closely linked with nutrition, such as hypertension (linked with excess salt consumption) are among the causes of major chronic non-communicable diseases such as diabetes and cardiovascular disease (CVD). Globally, the majority of the burden of those diseases is attributable to dietary risks and excess body weight (IHME 2015). However, diabetes and cardiovascular disease are also distributed unevenly within and between countries. **Figure 5.10** and **Figure 5.11** use Disability-Adjusted Life Years (DALYs) to show a larger than threefold variation in rates of disease burden across "GBD super regions"[2], with diabetes generating the largest burden in the 'Latin America and Caribbean' and 'North Africa and Middle East' regions, while the highest rates of CVD burden are observed in 'Central Europe, Eastern Europe and Central Asia', with 'South Asia' and 'Southeast Asia, East Asia & Oceania' following at some distance.

2 The Global Burden of Disease (GBD) study divides the world, for administrative and data analysis purposes, into seven "super regions", based not only on geographic location but also on country GDP (IHME 2017).

Like obesity, type 2 diabetes tends to be more prevalent in lower income populations than in high-income countries (IDF 2017), while it is often more common in the wealthier parts of the population of low-income countries, although these patterns tend to vary widely between countries. Inequalities in cardiovascular disease within countries tend to be associated more consistently with a greater burden of disease in low socioeconomic groups, partly reflecting the social distribution of smoking, a further major contributor to CVD.

Figure 5.10 Rates of disease burden of diabetes, all ages (Source: adapted from IHME 2015)

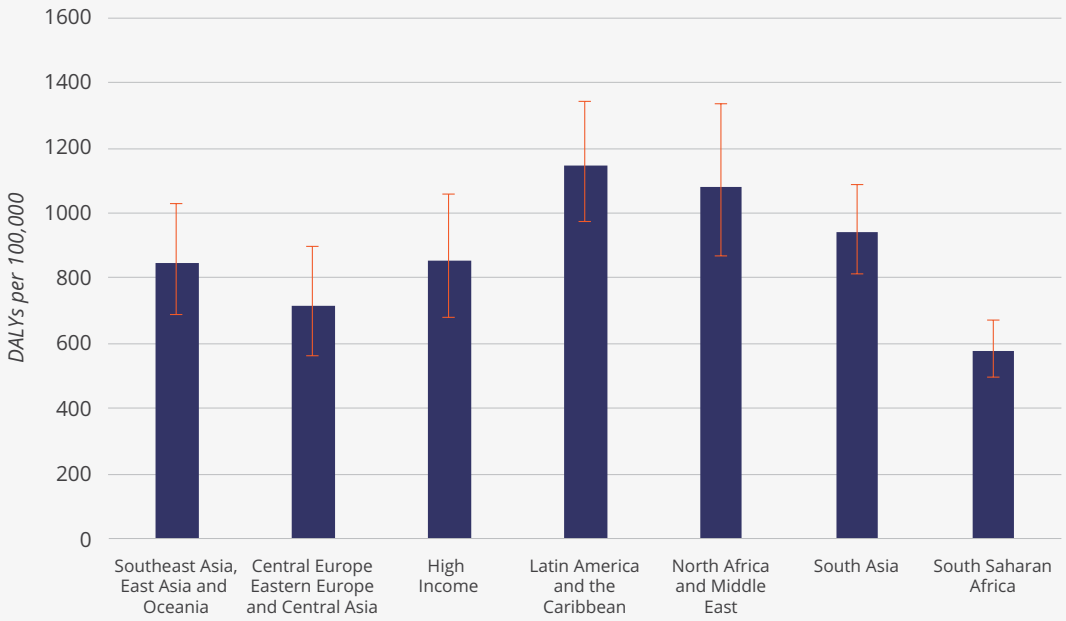
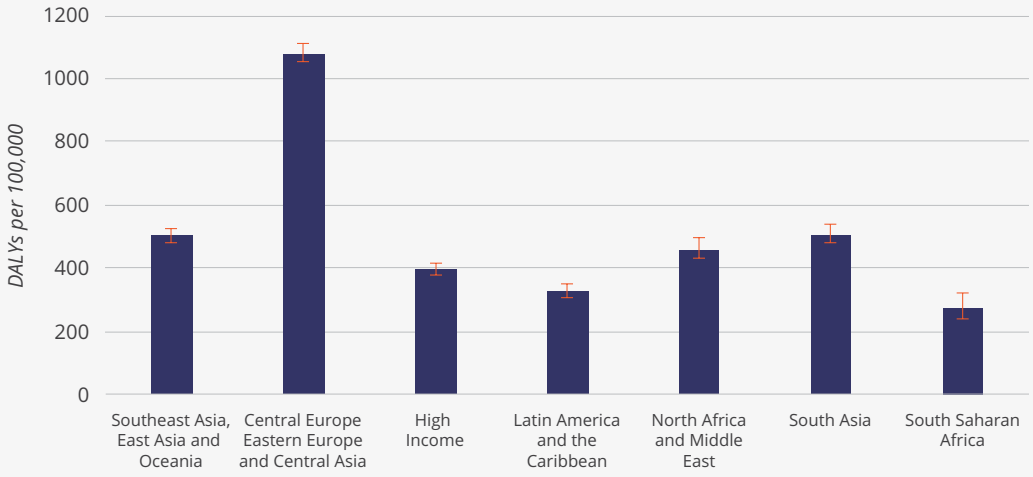


Figure 5.11 Rates of disease burden of cardiovascular disease (CVD), all ages (Source: adapted from IHME 2015)



5.7 FOOD TRADE AND EQUITY

Globalization of trade has led to unfair competition and hardships for primary producers in both developing and developed countries (FAO 2013). Several factors are at play, including country trade barriers. Primary producers are losing their land and are being driven to the cities by wars, environmental disasters, misguided public policy and economic desperation. All of these factors are leading to increased inequity (FAO 2013). The highly concentrated and multinational agricultural buyers often receive governmental support that distorts markets, encouraging pricing schemes that fail to reflect full costs to society and the environment while also failing to cover the full costs of production for primary producers (FAO 2014b). Food policies in developed countries that encourage or reward the undermining of fair trade practices negatively impact long-term sustainability and equity of primary producers (FAO 2014a).

Food production and trade play an important role in poverty reduction and shared prosperity. Poor households spend a large share of their income on food, and if food access and quality is not equitable, this can create further divergence in development outcomes in areas including health, education, and economic productivity. Environmental factors, such as climate change, also impact global food security and resource sustainability. As agricultural trade becomes increasingly important to national food supplies, the use of natural resources (land, water) can shift, leading to social and environmental externalities in food producing countries.

The food commodities that are globally traded are worth more than US$520 billion per year, could feed approximately two billion people, use about 13 per cent of worldwide cropland and pasture, and have geographically concentrated irrigation water demands (MacDonald *et al.* 2015).

When countries import food rather than produce it domestically, it can displace environmental problems abroad. For example, the expansion of production of palm oil, soy and meat has led to land-use change in tropical countries such as Indonesia and Brazil. The concentration of food exports in a few countries can create stress on natural capital in those countries and contribute even further to climate change and inequity. It can also put global food security at risk if those food sources are not sustainable or are sensitive to climate variations. The recent food price crises in 2007 and 2012 showcased these vulnerabilities; a combination of climatic factors, low inventories and export restrictions led to increases in international food prices above and beyond the initial shock. Often trade policies have reduced rather than increased the responsiveness of the food system to shocks. Those countries that concentrate natural resources (land and water) on supplying the food export market are mainly in the Americas, plus Australia and a few countries in Asia, Eastern Europe and West Africa; while the countries that are relatively disconnected from that trade are located in Sub-Saharan Africa, and South Asia (MacDonald *et al.* 2015).

The amount of food imported has little to do with food insecurity, and more to do with the competitiveness of domestic agriculture production. The problem begins when a country opens its borders to food imports (reducing import tariffs and barriers to trade) without properly preparing low-income farmers to compete with imported products. Poor consumers in urban areas benefit from low food prices, but if the rural population is not supported, this can cause an unexpected and sudden drop in agriculture production and in the income of the rural poor. Food trade deficits have ballooned in poor countries in recent decades, while these same countries should be taking advantage of local agriculture production to increase the income of the rural poor households. Therefore, many African countries are trying to follow the example of Brazil, which went from being a net food importing country to a net food exporting country in a period of 30 years. This trajectory is replicable for many agriculture-based economies in Africa and Asia, but it requires a set of macro- and sector-level policies that look at food trade (both imports and exports) as an opportunity rather than a threat. Furthermore, there is a link between countries that are less dependent on food trade and overall levels of poverty, in particular, rural poverty and undernutrition.

Considerations of health outcomes are rarely factored into food support policies or programs related to consumer goods. For example, the sugar market is one of the most distorted markets in the world. Small producers in less-developed countries cannot compete with countries benefitting from EU subsidies and support policies. Despite the fact that countries such as Mozambique and South Africa have the lowest cost of production, sugar farming cannot guarantee the livelihoods of small farmers there, with resulting impact on poverty rates in these countries (MA 2005). Thus, there is a clear link between food subsidies and policies in sugar markets and reduction of poverty and nutrition outcomes in these countries.

To develop equitable and sustainable trading relations, buyers should pay primary producers prices that reflect the real cost of the entire process of sustaining a regenerative ecological system (FAO 2014b). This includes inter alia supporting a decent livelihood for primary producers, their families and workers by providing living wages that cover producer's costs. Fair pricing becomes possible when buyers agree to negotiate with their suppliers on terms of equality before establishing contracts, whether written or verbal, that set the terms of trade.

5.8 FOOD WASTE – EQUITY ISSUES

Food is lost or wasted throughout the supply chain, from initial agricultural production to final household consumption. Food losses and waste impact food security and nutrition and the sustainability of food systems and their capacity to ensure good quality and adequate food for the current global population and future generations (HLPE 2014).

Nearly one-third of food produced for human consumption, approximately 1.3 billion tons per year, is either lost or wasted globally (HLPE 2014). One-fourth of the food currently lost or wasted globally could feed the 870 million hungry people in the world (Gustavsson *et al.* 2011). This is a clear indication of the inequity of distribution in the current food system. Food losses and waste often translate into economic losses for farmers and others stakeholders within the food value chain, and thus to higher prices for consumers; both factors contribute to making food less accessible for vulnerable groups (FAO 2017).

Without accounting for GHG emissions from land use change, the carbon footprint of food produced and not eaten is estimated to 3.3 tons of CO_2 equivalent. As such, food wastage (i.e. food waste and loss) ranks as the third top emitter after the U.S. and China (FAO 2013).

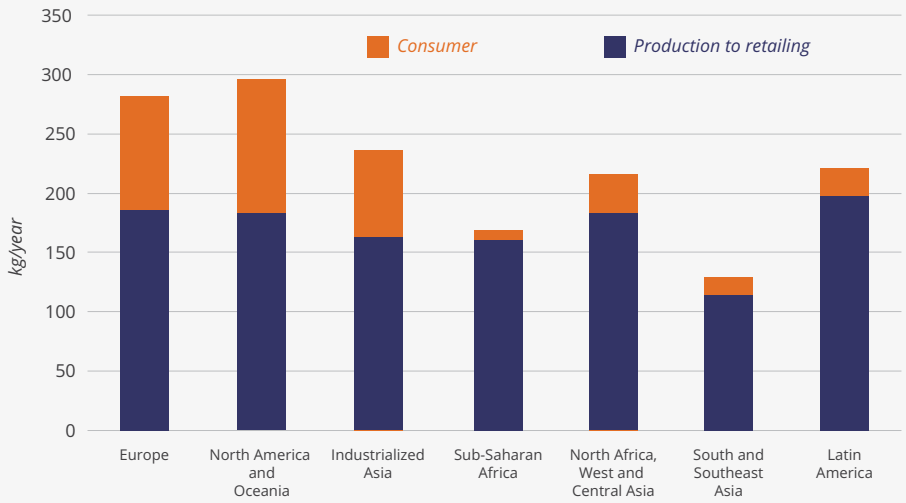
Food waste is a huge problem globally, but the underlying reasons for it differ between regions as seen in **Figure 5.12.** In medium- and high-income countries, losses tend to occur at the consumption stage, meaning that the consumer discards food even if it is still suitable for human consumption. Significant losses also occur early in the food supply chains in the industrialized regions. In low-income countries, food is lost mostly during the early and middle stages of the food supply chain before arriving at the consumer level (Gustavsson *et al.* 2011). Factors leading to food spoilage include lack of modern transport and storage infrastructure, as well as financial, managerial and technical limitations in difficult climatic conditions (Gustavsson *et al.* 2011; Venkat 2011).

The consumer share of food losses and waste can be very high in specific locations; for example, the amount of food wasted in one community in New York State in the U.S. in one year was sufficient to feed everyone in the community for 1.5 months. 60 per cent of the losses occurred after the food was purchased by the consumer (Griffin *et al.* 2009).

People's attitudes and approach to food waste can be altered in order to modify behaviour so as to minimize waste in the home, but technology is required to ensure that as little of the produce as possible is lost during distribution. The majority of losses in most countries occur during transit (Gustavsson *et al.* 2011). Technology, whether used in crop production, processing or distribution, can help to minimize losses.

Reducing food waste has enormous potential for reducing the resources used to produce food and can help lower the environmental impact of food production and consumption. Food waste prevention is an integral part of Europe's transition towards a circular economy (EC 2016), which is expected to boost global competitiveness, foster sustainable growth and generate new jobs.

Figure 5.12 Food losses and waste at consumption and pre-consumption stages by region (Source: adapted from Gustavsson *et al.* 2011)



5.9 ETHICAL CONSIDERATIONS IN THE ECO-AGRI-FOOD SYSTEM CONTEXT

Food systems and their resulting economic benefits have an ethical dimension related to feeding the world's population and preserving the planet's food-producing capacity and natural ecosystems for future generations. A number of ethical considerations in food systems are related to food policies and inherent in modern agriculture and food technologies, ranging from issues related to food safety and sustainability, to marketing and trade, consumers' choices, the role of corporate power, and the treatment of animals (European Communities 2008).

5.9.1 Corporations and ethics

Asymmetries of power and market concentration in large agriculture and food corporations are one of several important ethical issues identified in the modern food system (Global Food Ethics Project 2015).

Large agribusiness corporations dominate increasingly globalized markets due to their ability to achieve economies of scale. The objective of profit maximization drives most of the decisions of corporations in the agri-food sector. It is necessary to explore policies that can direct corporations to internalize ethics since this can be more profitable on the long run.

One of the most significant ethical issues related to agri-food corporations is the issue of patents on seed, which leads to monopolies on genetic material, high seed prices and impingement of farmer's rights. A small number of corporations in developed countries control seed distribution for new and possibly better products (European Communities 2008). Corporations controlling the intellectual property rights to seeds means they can restrict access to new 'improved' varieties and make those choosing not to purchase the seeds less competitive in the market, potentially trapping farmers in a cycle of poverty.

Multinational food and beverage corporations with powerful marketing strategies have also been a driving force in the increase in the global consumption of processed foods that contain large amounts of salt, sugar, and fat as well as the consumption of sweetened beverages (Monteiro and Cannon 2012). These ultra-processed unhealthy foods have displaced traditional food systems and healthy dietary patterns, undermining public health efforts (Monteiro and Cannon 2012). The extent to which large scale agricultural and food marketing firms and corporations contribute to food security and nutrition is undervalued in ethical debates (Global Food Ethics Project 2015).

There are ethical concerns regarding the claims from large corporations that, to overcome the impacts of climate change, population pressure and increased food demand, the world must develop new technologies at a global scale. These new technologies for food production, however, have been leading to inequitable conditions, such as competition policy that favours a few corporate actors and the suspension of the precautionary principle (Rigaud 2008; IPES-Food 2017). These actions represent a challenge to ethics and equity (see next section).

5.9.2 Ethics of modern developments and technologies in the food system

Increasing food production may require changes to the way we grow crops, use chemicals, choose crop varieties, or position and size farms. All of these may have an impact on the environment, on sustainability over a long period of time, and on safety both when the crop is consumed and on those working on the land or harvesting and transporting the crop (see Section 4.7.1 and Section 5.5.5).

New technologies in agriculture can help increase crop production and improve practices that benefit sustainability and food security for current and future generations (European Communities 2008). However, questions about the safety of these new technologies and their ability to address issues of poverty, hunger, malnutrition and loss of biodiversity remain.

For instance, modern biotechnology enables rapid changes to plants and animals. There are many gaps in the understanding of how, for instance, gene drive used as a set of technologies may impact the target organism, the environment, and subsequent generations. It is also essential to consider how gene drives will propagate throughout a population and affect not only the target species, but also its entire ecological community (NAOS 2016).

All of these new technologies may bring ethical considerations. Many concerns apply to modifications of plant species and animals. In the case of plants, the results of a disastrous modification or choices may impact on food availability and sustainability. In animals, the effect may be less disastrous to anything other than the particular breed, but ethically, whether we should introduce suffering to a group of animals for consumer gratification is something to be considered.

There is great concern that chemical residues, or genetic modification in food and feed may have an impact on those who consume the products and how mere exposure

to such residues can impact the environment (European Communities 2008). Food safety assessments and environmental impact studies are essential on a case-by-case basis. Most countries require safety assessments; many require comprehensive risk analyses and the application of precaution in cases of uncertainty. Taking into account the risks and benefits of not using any particular technology in the food system may be the most ethical approach to the introduction of new technologies in food.

Nanotechnology is an emerging technology used in the food industry that affects every aspect of the food system from production to processing, packaging, transportation, shelf life and bioavailability[3]. Human exposure to nano-materials is increasing and the health impact of nano-materials in food is of major public concern (Wallace Hayes and Sahu 2017). Since nanotechnology is a new and rapidly developing technology, very limited information exists about its safety concerns, which raises ethical questions about its use. Currently there are no internationally accepted standard protocols for toxicity testing of nano-materials in food or feed. An international regulatory framework for the evaluation of nanotechnology for both food and animal feed must be established (Wallace Hayes and Sahu 2017).

Uncertainty and the precautionary principle

Contemporary environmental health risks result from complex interactions among new technologies, genetic, nutritional, chemical and environmental and socioeconomic factors.

In areas such as chemical safety, biotechnology or nanotechnology in the food sector, the potential for environmental and health impacts may be great, including the deterioration of ecosystems, the persistence of ubiquitous endocrine-disrupting chemicals, the cross-breeding of genetically modified species or the introduction of nano-particles in human tissues. These practices may be harmful to health directly or indirectly through effects which may be difficult to detect and measure, but with serious consequences, perhaps borne by the most vulnerable or any person, or in the future (Martuzzi 2007). The precautionary principle should be taken into account when there is a risk to health or environmental damage and relevant scientific data are not available, to make sure that all technologies avoid the risk of 'serious or irreversible damage' (UN 1992). The precautionary principle provides a useful means of guiding decisions under conditions of uncertainty, in a manner that appropriately addresses the issues of power, ownership, equity and dignity (WHO 2004).

3 Bioavailability can be described as the degree to which food nutrients (or nutraceuticals) are available for absorption and utilization in the body.

5.9.3 Food loss, waste and management: ethical considerations

The minimization of food waste and losses during production, post-harvest and processing, as well as marketing and consumption are ethical imperatives (FAO 2014b) (See Section 5.10.3).

The generation and disposal of agricultural waste, and in particular of hazardous waste, can result in negative social impacts (e.g. health risks, noxious odours), environmental pollution (e.g. leaching from inappropriate disposal, gaseous emissions) and economic damage (e.g. cost of disposal and rehabilitation). The food system dominates anthropogenic disruption of the nitrogen cycle by generating excess fixed nitrogen. Excess fixed nitrogen augments the greenhouse effect, diminishes stratospheric ozone, promotes smog, contaminates drinking water, acidifies rain, eutrophicates bays and estuaries and stresses ecosystems (Socolow 1999).

Plastic packaging waste from the food and beverage processing sectors is also a growing environmental health concern. Plastic packaging is the fastest growing form of packaging and only 14 per cent is recycled in the U.S. (MacKerron 2015). The rest ends up in landfills and is a major contributor to ocean pollution. Most plastics currently used to package food are made from petrochemicals and are not biodegradable. Marine plastic litter poses a global challenge, directly affecting marine and coastal life and ecosystems, enters into the food chain representing a risk for human health and future generations. This raises ethical and intergenerational justice considerations. In this context, the EU has been supporting research to develop greener, sustainable alternatives to cut plastic waste and promote biodegradable plastics made from crop waste for use as food packaging, as part of the European Strategy for Plastics in a Circular Economy (EC 2018). The EU has committed to increase recycling target of plastic packaging to 55 per cent and reduce landfill to less than 10 per cent by 2030.

5.9.4 Ethics of food and meat consumption in high-income and middle-income societies

Food choices and consumption behaviour involving purchasing and disposing of food can have ethical significance. The tradeoffs between environmental sustainability and ensuring that individual dietary and nutritional needs are met can be a source of ethical tension (Fanzo 2015).

A common trend in many countries is the shift from plant-based diets to income-dependent diets with high animal source foods such as meats, dairy and other

animal products (Popkin *et al.* 2012; Tilman and Clarke 2014). There are worldwide inequities in the consumption of animal sourced foods. While the global average for annual consumption of meat is 38 kg/capita, the U.S. consumes 124 kg and countries in Africa and South Asia consume the least amount of meat (between 3 and 5 kg) (Speedy 2003). The increase of meat consumption in high-income and middle-income countries has ethical considerations (Global Food Ethics Project 2015). For example, increased demand for animal source foods and livestock production has implications for climate change, human health, environmental pollution, biodiversity loss and animal welfare (FAO 2006). There are also ethical issues related to the use of food crops to feed animals and for biofuels while global hunger affects more than 800 million people worldwide (FAO 2008). In the near future, such ethical concerns may play an increasing role in affecting the production and consumption of livestock products (Thornton 2010).

5.9.5 Animal welfare and ethics

Animal welfare refers to the physical and psychological well-being of animals. Research into animal behaviour has provided evidence supporting the notion of animal sentience (i.e. animals' capacity to sense and feel), which in turn has provided the basis for EU legislation that integrates the concept of animal sentience into law (Lawrence 2009; Thornton 2010). With this in mind, keeping animals free from hunger, thirst, discomfort, pain, disease and other distress, and providing conditions that they allow them to express their natural behaviour, are considered to be important ethical considerations.

Livestock production is predicted to double in 2050 from present levels, with most of the increase taking place in developing countries where conditions for animal health and welfare raise major ethical concerns. Overcrowding, use of non-adapted breeds, inappropriate use of hormones and drugs, lack of space, clean water and feed, and cruel treatment are common in livestock production systems (FAO 2014b). These and other considerations (e.g. stocking densities) along with slaughtering ethics also relate to fisheries and aquaculture industries.

The EC (2006) and World Organisation for Animal Health (OIE 2017) have adopted standards for the international welfare of domesticated animals and food, which created mandatory animal welfare standards for most foods of animal origin.

5.10 POLICY RESPONSES TO BUILD EQUITABLE FOOD SYSTEMS

Creating an equitable food system requires developing a set of policies geared toward the issues raised in this chapter, namely: improving poor people's access to land, water and other natural resources, ensuring labour rights, improving access for all to new technologies, such as improved seeds and information technology, creating access to local and international markets, and investing in improving gender equality and women's education and status among others (Pinstrup-Andersen *et al.* 2001; Kessler and Chen 2015).

5.10.1 Healthy, affordable, ethical, fair and sustainable food systems

FAO (2011) proposes that a more equitable, ethics-based, food and agriculture system must incorporate concern for widely accepted global goals, each of which incorporate numerous normative propositions such as improved well-being, improved public health and protection of the environment.

Accessible and affordable healthy diets

Equitable food systems should offer healthy food options that are accessible to and affordable by a community's neediest members. Policies enacted in cities and towns can play an important role in providing access to affordable and healthy food options. For example, CDC (2014) provides strategies and guidance for full-service grocery stores, small stores, farmers' markets, mobile food retailers, and transportation/distribution systems, particularly in underserved areas.

Regulatory policies have been used widely to improve the quality of people's diets. These include, in particular, the regulation of the nutritional information conveyed to consumers on food packages (nutrition labels), the regulation of food advertising (particularly to vulnerable consumers, such as children), and the regulation of the use of particular ingredients in food manufacturing (e.g. industrially produced transfats). There is evidence that consumers use nutrient lists, but label use is considerably lower among people of lower socioeconomic conditions (Sassi *et al.* 2009). Multi-country modelling studies found that mandatory labelling schemes are effective in countries at different levels of income (Sassi *et al.* 2009; Cecchini *et al.* 2010). "Traffic light" labelling[4] was also

4 Food may be labelled with a traffic light label showing how much fat, saturated fats, sugar and salt are in that food by using the traffic light signals for high (red), medium (amber) and low (green) percentages for each of these ingredients.

shown to be effective (Sacks *et al.* 2011) and using a mandatory "tick" symbol to indicate products low in salt, with the expected effect of food companies significantly reducing salt content, was shown to be effective (Cobiac *et al.* 2010). There is also evidence that food labelling may pressure companies effectively, and lead to reformulation of food contents – e.g. reduction in salt and fat, or increase in fibre (Vyth et al. 2012; Capacci *et al.* 2012).

Existing studies suggest that regulation of advertising to children (Chou *et al.* 2008; Magnus *et al.* 2009), and particularly in fast food (Dhar and Baylis 2011), can have positive outcomes for dietary intake (Veerman *et al.* 2009). One of these studies compared the cost–effectiveness of restricting commercial promotion through mandatory and self-regulatory approaches in five countries (Sassi *et al*. 2009; Cecchini *et al*. 2010; Sassi 2010). Restrictions were highly cost-effective in the 20 years after implementation, especially in low- and middle-income countries, where they may even be cost-saving in some instances. Also, the extension of existing regulations in Australia to include food advertising during specified children's TV viewing hours was found to be a highly cost-effective policy (Magnus *et al.* 2009).

Ethics and ethical traceability

Equitable food systems should be built around the fundamental values of food ethics from the perspective of both suppliers and the consumers. From the supply end, ethical concerns about animal welfare, production methods, working conditions, terms of trade, impact on the environment, and food safety and security should all be considered comprehensively. These concerns relate in turn to the concepts of trust, voice and transparency (Lang 2010). Ethical traceability is a tool that can be used to keep track of the ethical aspects of food production practices and the conditions under which the food is produced and can apply to all actors in the food chain: suppliers, producers, processors, retailers and consumers. From the demand side, there are ethical considerations related to consumer's unsustainable dietary choices and food waste. There appears to be a gap between the ethically-minded consumers' intentions and their actual behaviour (Carrington *et al.* 2010). Therefore, understanding how to close the gap between ethical intentions and purchasing decisions will be paramount to protecting food system ethics.

Environmental, social and economic sustainability

Sustainable food systems deliver food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised (HLPE 2014). A sustainable system would feed and nourish the world using the fewest resources possible, while improving the availability, access and utilization of food resources over time. Even more, sustainability in food systems would especially ensure that communities in rural areas of the world will have food security and that they would also control their lands to be used in an efficient way. FAO (2014b) proposes five key principles that balance the social, economic and environmental dimensions of sustainability: i) improving efficiency in the use of resources; i) conserving, protecting and enhancing natural ecosystems; iii) protecting and improving rural livelihoods and social well-being; iv) enhancing the resilience of people, communities and ecosystems; and v) promoting good governance of both natural and human systems. These five principles provide a strong basis for developing equitable and socially just national policies, strategies, programs, regulations and incentives that could guide the transition to an agriculture that is highly productive, economically viable, and environmentally sound.

Equitable and fair trade

In order for the food system to provide opportunities for poverty reduction and shared prosperity, WFTO (2004) recommends that international development policies and initiatives need to:

i) focus on ensuring a sustainable and reliable source of food production in key agriculture-exporting countries;

ii) support agricultural development in countries where the poor rely heavily on agriculture for incomes and nutrition; and

iii) ensure that food importing countries have social protection systems in place to absorb volatility in international food markets.

Perhaps the most well-known examples of this is the fair trade movement (see **Box 5.8**).

5.10.2 Gender equity and equality

Equitable food systems need to eliminate gender barriers in agriculture and food systems. **Box 5.9** describes a number of areas in which policies could strengthen the rights and participation of women in agriculture.

Box 5.8 Fair Trade

The Fair Trade movement is a global initiative with the overarching goal of greater equity in international trade. It began with the initial objective to establish partnerships between the suppliers and consumers of the global North and the smallholder farmers and producers of the global South through Fair Trade Organizations (FTOs) worldwide. This movement aimed to create opportunities for marginalized producers in low-income countries to improve their livelihoods through fair access to export markets.

Fair trade is now an international movement that seeks to provide products that respect not only the people, but also the planet. A guiding set of standards apply to smallholder farmers, workers, and artisans to ensure they get their rightful share of benefits from trade, as well as safe and healthy work environments and adequate housing where appropriate. All products that meet the standards are certified and recognized globally with the FAIRTRADE logo. Fair-trade International also works to guarantee traceability of products. Fair trade offers consumers a direct way to alleviate social inequity by helping disadvantaged communities through purchasing choices.

Box 5.9 Policies to strengthen the rights and participation of women in agriculture

FAO (2011) proposes four key areas in which policies could strengthen the rights and participation of women in agriculture:

i) Support women's leadership capacity-building in rural organizations: Women in developing countries represent 43 per cent of the workforce in agriculture. Improving access to technology and the information to implement those technologies in agriculture, providing climate mitigation and adaptation strategies, and training in marketing, leadership and communication will help build their capacity. To close the gender gap, women need to be educated on policy issues that affect them as farmers and producers. Empowering women with these tools will make smallholder agriculture more sustainable and it will increase productivity overall.

ii) Improve women's tenure over productive resources such as land and water: To ensure women's rights to an adequate standard of living it is essential that women have access to productive resources such as land

and water. If women are granted the same access to land as men, their productivity can increase 20-30 per cent, which would raise the overall agricultural output in developing countries by 2.5 or up to 4 per cent. This increase in production could potentially decrease hunger in the world by 12-17 per cent (FAO 2011).

iii) Support women's economic empowerment through training: This can lead to an increase not in only in their productivity in agriculture, but it can also lead to human capital improvements including better nutrition, education, and health of entire families. Women's economic opportunities can be improved providing training in production techniques, business managements and financial literacy. Granting women equal rights of access to financial services is the first step to reduce the gender gap in this area. Microfinance programs have proven to be effective in overcoming barriers for women in the credit markets. Giving women access to information and legal services is crucial for gender equity especially in terms of land acquisition.

iv) Improve women's participation in, access to and control in local markets: Improving women's participation and access to local markets requires program interventions that are based on careful analysis. Women tend to be smallholder farmers who cultivate traditional crops for their own consumption and sale (Pehu *et al.* 2009). This scenario for women in agriculture and the market place will change if they are granted greater access to own land and to the financial resources they need to increase their productivity and be more competitive. Education and training are important factors in increasing women's presence and impact in the market (Pehu *et al.* 2009).

5.10.3 Labour rights and equitable food systems

To end child labour, forced labour and slavery will require a multi-sectoral effort to address economic, socio-cultural and legal aspects that contribute to poverty vulnerability and enable exploitation. ILO (2017b) lists a set of overarching policy priorities that can help in these goals, including:

i) strengthening social protection programs to offset the vulnerabilities that can push children and people into forced labour and slavery;

ii) extending labour rights in the informal economy, where child labour, forced labour and slavery is most likely to occur;

iii) improving migration governance;

iv) addressing the root causes of debt bondage;

v) strengthening and extending national research and data collection efforts on child and forced labour and modern slavery to guide national policy responses; and

vi) encouraging international cooperation among governments and with relevant international and regional organizations to address forced labour modern slavery (given its global and cross-border dimensions).

Areas of cooperation between and among governments should include labour law enforcement, criminal law enforcement and the management of migration in order to prevent trafficking and to address forced labour across borders.

Increasing support for worker organizations and their collaborations with other groups outside of the government can aid capacity building of these groups, enabling them to better resist corporate and industry violations (FAO 2014b). On the international level, workers need to be represented in forums to monitor compliance with agreements to ensure that stronger regulations are put in place and that the global community complies with the norms.

In correcting the labour-related inequities in the food system, reform-minded individuals might consider pursuing two types of strategies: i) removing barriers to the enforcement of existing labour and employment protections; and ii) bolstering and improving existing laws (Lee 2017) (See, for example, **Box 5.10**).

Box 5.10 Strategies for improving labour enforcement in the U.S. food system

Lee *et al.* (2017) describe a situation in the U.S., where significant resource constraints on enforcement agencies like the Department of Labour (at the federal level), as well as at similar agencies within the various states, limit their effectiveness. There are many worksites to investigate. Technology might allow agencies to deploy their resources more efficiently, thereby expanding their reach and influence. In recent years, agencies have experimented with technology that enlists the help of consumers in enforcing labour law. The U.S. Department of Labour has utilized both app-based and web-based technology to disseminate information to the public about non-compliant businesses so that consumers can "vote with their dollars". These technologies enable labour officials to convert a relatively inscrutable inspection into a public spectacle that can be broadcast across popular information-sharing channels, thus encouraging restaurants across the industry to comply with labour requirements or else face the possibility of negative public attention. A larger issue is immigration reform that would include an opportunity for currently unauthorized workers to adjust their status. Enabling workers to obtain formal work authorization strips employers of the removal threat, which would in turn empower workers to enforce labour and employment laws themselves.

Bolstering and improving existing labour and employment laws in the restaurant industry would also help. The most obvious would be to do away with the current tip-based wage system that characterizes the restaurant industry. Rather than allowing restaurant owners to use customer tips to subsidize their wage responsibility, Congress could repeal the tip-based system thus making restaurant owners bear full responsibility for wages and bringing restaurants in line with conventional labour and employment norms. Raising costs for restaurant owners may force some out of business, but the severity of this problem remains understudied. Administrators could take less drastic steps by relaxing the regulations governing tip sharing and thereby close the wage gap separating the front and back of the house. With the right adjustments, tip-sharing policies could allow restaurants to create more equitable norms on the issue of pay.

5.10.4 Education

Knowledge and education can help break the poverty cycle, achieve sustainable food systems, close the gender gap in agriculture productivity and contribute to social equity.

Rural education is key to lifting rural families out of poverty and helping farmers to improve management techniques and reduce negative social and environmental externalities. Initiatives such as Farmer Field Schools (see **Box 5.11**), which aim to improve education, co-learning and experiential learning so that farmers' expertise is improved, can contribute to sustainable and equitable food systems, for example by providing resilience to current and future challenges in agriculture.

Farmers should be able to produce food that is socially, economically and environmentally responsible and consumers are expected to make informed choices that are conducive to healthy lifestyles (MA 2005). Both goals require building sustainable food consumption and production knowledge systems, improving food literacy policies, promoting domestic food preparation and healthier diets and lifestyles, and furthering knowledge of the benefits of short food supply chains (MA 2005; Vidgen 2016; Kneafsey *et al.* 2013).

5.10.5 Economic instruments

Food procurement as an economic development driver

Food procurement can act as an economic development driver that promotes equity. Some of the principles that may contribute to sustainable and equitable food systems include: sourcing food from small-scale producers, guaranteeing living wages and fair prices along the food supply chain, setting specific requirements for adequate food diets to promote healthy lifestyles, sourcing food locally when possible, demanding that suppliers produce food using sustainable practices, designing contracts that will benefit suppliers and ensure that they capture a fair portion of the value, and increasing participation and accountability along the food supply chain (de Schutter 2015).

Ecosystems services payments as a driver to promote equity

Equity and fairness are specific to each group of people who hold similar values. Groups evolve and change over time; so do value systems. Equity can refer to the participation in the decision making process (procedural justice) or to the allocation of outcomes (distributive justice). Both are important, as the former establishes how a Payment for Ecosystem Services (PES) scheme works while the latter focuses on the distribution of benefits and losses. Pascual *et al.* (2010) argues that different fairness criteria have different implications in PES schemes and offers a useful classification of different economic fairness criteria as presented in **Table 5.3**.

Box 5.11 Farmer Field Schools and social capital

Farming is often a collective business and farmers occasionally form formal groups and structures to sustain their activities over time. Recent approaches such as Farmer Field Schools, participatory irrigation management, watershed management, microcredit groups and joint forest management have increased social capital in agricultural systems and contributed to transformed social equity. These measures are helping to transform some natural resource sectors, such as forest management (e.g. with 25,000 forest protection committees in India), or participatory irrigation (e.g. with 33,000 active groups in Sri Lanka). Nearly two million Asian farmers are engaged in sustainable rice management as a result of Farmer Field School programs (FAO 2018b).

Table 5.3 Fairness criteria for PES programs (Source: Pascual *et al.* 2010)

Fairness Criterion	Design implications
Compensation	Payments should compensate landholders for the forgone benefits related to the provision of environmental services. Payments are differentiated according to the cost of provision.
Common goods	Payments should be invested in common goods, so all providers' benefit indirectly and according to their relative use of the common goods in question. Payments are not differentiated (no direct payment).
Egalitarian	Design should distribute funds equally among all the providers (per unit of land area, for example), independently of the level and cost of environmental service provision. Payments are not differentiated.
Maxi–min	Payments aim to maximize the net benefit to the poorest landholders, even at a cost of efficiency loss. Payments are differentiated according to the income of providers.
Actual provision	The allocation of funds among landowners corresponds to the actual outcome level of provision of environmental services. Payments are differentiated according to the actual provision of the service.
Expected provision	Payments to landholders depend on the expected level of provision of services for a given land use. Payments are differentiated according to the expected provision of environmental services. These payments compensate landholders to particular land use changes or practices expected to enhance the provision of environmental services.
Status quo	Payments should maintain the previous level of relative distribution of income among providers. Payments are differentiated according to its impact on income inequality.

The fairness criteria adopted by a PES scheme reflects and affects the relative weights given to equity and efficiency concerns within the program. Key research priorities have been identified with regard to the interdependency between efficiency and equity effects in PES programs (Muridian *et al.* 2010; Pascual *et al.* 2010), including: i) the need to analyze the potential context-dependent impacts of applying different fairness criteria and the social reasons explaining why a particular criterion prevails over others and how this may change over time (Pascual *et al.* 2010), ii) the need to take into account the institutional backdrop affecting the power relationships between buyers and sellers of environmental services, and iii) the need to address uncertainty arising from the complex links between ecosystem processes, services and values and how this impacts intermediary coordinating stakeholders' actions. In this regard, close collaboration between ecologists, economists and social scientists needs to be forged.

Taxes on food to promote healthy diets

Taxes on food and non-alcoholic beverages are used in an increasing number of countries to improve the quality of people's dietary choices and encourage healthier eating. The role of taxes as a public health tool has been debated for a long time (e.g. Jacobson and Brownell 2000; Marshall 2000), and taxes have been implemented recently in many jurisdictions, particularly on sugar-sweetened beverages.

Several countries, including the United Kingdom (Smith *et al.* 2018), Portugal (George 2017), Spain (Ortún *et al.* 2016), Estonia (Kohler and Reinap 2017) and South Africa (Stacey *et al.* 2017) announced plans to introduce taxes on sugar-sweetened beverages in 2016. Similar taxes have also been implemented or are being implemented in several US cities (Powell and Maciejewski 2018), Latin American (Nakhimovsky *et al.* 2016), and Asian countries (WCRF 2017).

The evidence base on the potential effects of taxes on nutrition and health has grown considerably in the past few years. A recent review by Sassi *et al.* (2013) concluded that taxes have the potential to shift consumer behaviour towards healthier dietary patterns, but the effects depend largely on the details of the policy design. A review of simulate models concluded that taxes on carbonated drinks and saturated fat and subsidies on fruit and vegetables would be associated with beneficial dietary change (Eyles *et al.* 2012). Detailed analyses of the impact of the tax implemented in Mexico have shown a significant reduction in the consumption of sugar-sweetened beverages and substitution with water, especially in low socio-economic groups (Colchero *et al.* 2016).

Food subsidies can either be targeted at specific food commodities, or at consumers (in general or selected groups). In the former case, the challenge is to ensure that subsidies effectively translate into reduced market prices; in the latter, that consumers spend the extra money to purchase healthy foods. Studies on the effects of population-level food subsidies, reviewed in Thow *et al.* (2010), suggest that subsidies influence consumption in the intended direction, and that taxes are more effective when combined with subsidies. Lower prices of fruit and vegetables were found to be associated with lower weight outcomes, especially for children in low-income groups and for those with the highest levels of body mass index (Powell *et al.* 2013).

The potentially regressive financial effects of food taxes are a source of concern. However, in many low-income countries, a larger proportion of high-income than low-income households purchase foods and non-alcoholic beverages that are typically targeted by those taxes, and even in countries where the opposite is true, the extra burden of taxation borne by low-income households is relatively modest (Zhen *et al.* 2013).

5.10.6 Good governance

Ensuring equitable and sustainable food systems requires good governance in the social, environmental and economic spheres. For example, environmental issues that affect sustainable food systems and equity include climate change, loss of biodiversity, ocean acidification etc. Economic issues that contribute to inequity include low wages and limited food access; these issues are more dire for populations such as women, poor people and people of colour.

Good governance considers issues of corporate ethics and transparency, increases participation and accountability (holistic audits, responsibility and transparency), considers threats to the rule of law and supports holistic management (FAO 2014a). All of these factors can contribute to sustainability and equity. Decisions concerning the environment, the economy, or social well-being must consider all affected stakeholders.

Precaution is a fundamental element of good governance and it is necessary, either when potential health, environmental or social threats can be far-reaching and irreversible, when technological development evolves fast enough to outpace the accumulation of data, knowledge and evidence, or when the adverse impacts of policies may be felt at great distances, or by future generations (Martuzzi 2007). The precautionary principle serves as a guide for considering uncertainty of the effects of human activities, and provides a framework for protecting humans, other species and life sustaining ecological systems now and in the future (WHO 2004). The precautionary principle is particularly important in transition economies that may have greater environmental, health and equity problems related to food systems; in these countries, economic priorities may outweigh the need to protect health, the environment and social equity (WHO 2004).

5.11 CONCLUSIONS

There are many social equity and social justice aspects (and determinants) that can be affected by different activities of the agri-food system including production, processing, manufacturing, distribution, trade, retail, access, consumption, and waste generation and management. The chapter has identified main components of equitable food systems and existing policies to promote them. Labour rights, working conditions and wages, gender equality, health equity, trade issues are all relevant in agri-food systems.

Ethical considerations related to food systems may range from issues related to human rights, sustainability, new technologies, safety, the roles of corporations, marketing and trade, dietary choices such as increasing meat consumption in high-income and middle-income countries, animal welfare, and the use of crops for energy and animal feed in a world affected by hunger and malnutrition.

More complex food systems can result in increasing unpredictable risk factors and uncertainty, and the use of the precautionary principle can encourage cross-disciplinary problem solving to address complex risks.

The large food requirements projected by the poorest regions in 2030 combined with the damaging impacts that climate change will have in exactly in these regions, disproportionately affecting the most vulnerable farmers it is matter of a critical concern. A key challenge from an equity perspective is to maximize the inclusion of smallholder farmers, women and the youth in the world's food system. These new challenges will come on top of existing challenges such as the gender productivity gap or imbalances in food trade. Equity challenges become more complex due to the accumulated impacts of different factors.

Poverty and malnutrition in all its forms, despite recent progress, should remain a focus of concern. Long-term trends, such as urbanization, means urban poor populations will continue to increase and remain very vulnerable to changes in food prices. At the same time, undernourishment coexists with an obesity crisis (related to growing levels of diabetes, heart diseases and certain cancers) in the world.

Considering the multi-dimensional aspects of social equity is critical to achieving equitable food systems. Policies can promote equitable and ethically-based food systems; to do so they must incorporate widely accepted global goals, each of which incorporate numerous normative propositions such as improved well-being, improved public health and environment. These policies include the promotion of labour rights, gender equality, fair trade, education economic and regulatory mechanisms and good governance in order to promote affordable healthy diets for all and ethical, fair and environmentally and socially sustainable food systems. Labour rights apply to enterprises of all sizes and types (primary production, processing and marketing), as well as all types of ownership structures including cooperatives, single-family businesses, collectives, community-owned land trusts, tribal associations, and corporations. Ethical issues play a key role in building equitable food systems. Other policies that contribute to equitable food systems include advancement of education policies (rural education as well as sustainable consumption policies), incentives through food procurement, payments for ecosystem services using fairness criteria, use of taxes and food subsidies to improve the quality of people´s dietary choices and regulatory mechanisms.

A comprehensive approach to reducing health inequities related to food systems, such as inequities in obesity, involves a combination of policies that address inequities in the root social determinant, as well as policies that treat the symptoms or attempt to compensate for inequities in the social determinants of health.

Good governance in the social, environmental and economic spheres is in the realm of equitable and sustainable food systems.

Social equity, justice and ethical considerations should be fundamental values underlying sustainable food systems. Social equity is a critical component of most SDGs, which will likely drive development policies for the next 15 years and it is critical they are achieved with equity in mind. TEEBAgriFood suggests using a three-tiered structure for the 17 SDGs, emphasizing how our planet's natural resources underpin delivery of the 2030 Agenda. This means that the SDGs should be implemented in an integrated manner and that equity should be seen as a crosscutting issue. The TEEBAgriFood Framework offers an approach to assess the cost and benefits of the impacts of food systems on different aspects of social equity considering all the components, institutions and policies of the food system, from the production and processing phases, trade to access and consumption including food waste management. In this context, the TEEBAgriFood Framework could provide a means by which information and data on social equity related to food systems can be collected and organized to assess progress towards the SDGs.

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