Index

2007–2008 food crisis
creating disequilibrium in global food system 32
export restrictions during 27, 30, 31, 33–5
impact of strategies 31
increase in output putting downward pressure on 29
lessons learned from 32–4
real hardships arising from 32
reasons for brevity 33–4
as result of convergence of shocks 29
rising food prices 27–8
and self-sufficiency 40
stockholdings in wake of 61
2050
expected population peak 207, 208
global food security in 200–202
population projection 144, 145
prospects for 149, 207–9

acceptance
divergence in relation to GMO 54, 175, 182–3
of new technologies 176, 188

accessibility
and charities 133
income questions regarding 93
problem of insufficient income as cause of 91, 135
poverty leading to 140
subsidizing food prices as alternative to 102–4
viewed from perspective of too-high prices 97, 102
relation to poor diets and detrimental health outcomes 125, 126
supermarket metaphor 91

adequate income
conceptualization 8–10
income policies 91, 93–5, 135–9
other forms of direct income enhancement 139–40
as pillar of food security 2–3, 48
supermarket metaphor 2–3
unwise use of 106–7
see also inadequate income
Agreement on Agriculture (AoA) 59, 68, 71
agricultural inputs 1, 8, 19, 79, 80, 92, 148, 178–9, 182, 183
agricultural productivity
and climate change 153, 155–7, 208
investing in 188–95
in race between forces of change 148
see also increasing agricultural productivity
agricultural research and development (R&D)
funding of 159–60, 189–95
investment in adaptation to climate change requiring additional 5
falling rate of 168
leading to increases in global agricultural productivity 167
and resistance to new technologies 188
located in developed countries 173–4
underinvestment in 165–6, 167, 173, 188, 195, 208
as widely diffused 159
agricultural technology
 genetics ushering in new phase of 162–3
Food security

investment in 148, 163–5
slow diffusion of 147, 152
agricultural trade
freeing up, contributing to
overcoming availability facet
of food security 62
policy distortions in 53–61
reduction of friction in navigation
law facet of 50
Agricultural Trade Development and
Assistance Act (PL 480) 69
agriculture
and climate change 151–7
scientific 159–68
scientific advances in 171–6
an Gorta Mór see Irish famine
applied chemistry
importance of 175–6
investment related to 164, 174, 189
as source of increasing productivity
4, 159, 161, 167
as technological driver of change in
agriculture 53
as understood in 1920s 171
applied genetics
advances made in 1920s 171
controversies over 5, 173, 174–5,
208
criticisms relating to 162–3
importance of 175–6
investment related to 10–11, 164–5,
173, 175, 190–192
as source of increasing productivity
4–5, 159, 161–2, 167, 208
as technological driver of change in
agriculture 53–4
arbitrage
and information flows 20, 22
leakage arising from 108
opportunities for international, as
basis of international trade in
food products 49
as preventing sustained price spikes
200
as price moderator 29
relation to food security 15
retailers and suppliers as exploiting
opportunities of 48–9
and rising food prices 27
and supermarket chains 21–2
and transformation infrastructure
20, 21
availability
conceptualization 6–8
of food
and black markets 32
castles and sieges 83–4
challenges continuing to thwart
food security 207
and Covid-19 pandemic 203,
205, 206
and famine 14, 15, 16–17, 18,
19, 22, 23, 26, 66
and food banks 130, 132
and Mercals 82–3
payment issue 65
and rationing 99–100
and starvation 75–6
and supermarkets 22, 117–18,
126
land 118, 121, 123
of new technologies 53
as pillar of food security 2, 48
role of trade 48, 56, 62
of transportation infrastructure 20,
21, 23, 41, 49
benefits
of CGIAR investment 173
of food stamp programme 111–12,
115
from Green Revolution 179, 181,
184
from primary research 189–90, 194
welfare 1, 137–9
big data
as facing no significant resistance
207
as fastest rate of productivity
improvement 207
as new avenue for increasing
productivity 4, 174
potential to mitigate climate change
208
private sector investment related to
165, 189
as revolution in production of data
and its analysis 54
as technological driver of change in agriculture 53, 54–5, 163
thread of agricultural research based on 160
black markets 32, 92, 103
brain drain 190
budgetary cost 102, 103–4, 115
Canada Pension Plan (CPP) 137
cash-based food aid 66, 69, 71, 72
cash exchange 9, 107–8
cash transfer system 33, 112, 139–40
cashout 136–7
castles 83–4
CGIAR see Consultative Group on International Agricultural Research (CGIAR)
charity 3, 128–9, 133
see also food banks
check off 194–5
chemistry see applied chemistry
China, famines in 16–18, 40, 76–8
chronic food insecurity 138
chronic undernourishment 66
civil unrest in areas of Africa 86–7, 202
destroyer of food security 78–81
disrupting agricultural production 19
food used as weapon during 81–5
protecting food aid shipments during 85–8
and slow deterioration of food availability 75
climate change
adaptation to 5, 153–4, 208
and agriculture
changes brought about by 154–6
context 151–4
study conclusions 156–7
geographic impacts 152–3
and investment 5, 153, 156, 208
use of big data in effort to mitigate 208
vulnerability of Africa 202
as ‘wicked problem’ 154
cold chains 51–2
Common Agricultural Policy (CAP) 45, 58, 67, 68
conflicts as cause of disruption in agricultural production 18–19
distorted agricultural trade leading to 56
domestic 18, 78, 86–7, 202
exacerbating disruptions to food supply 202
food security during 75–8, 88, 202
food used as weapon to alter outcome of 81–5, 88
international trade as source of 58
political, United Nations established to deal with 57
recommendations 88
WFP bringing food to conflicted areas 85–7
see also Second World War; Ukraine-Russia war; war
Consultative Group on International Agricultural Research (CGIAR) 173, 180, 193–4
convenience stores 117–18
Covid-19 pandemic 26, 202–7
dietary variety 132
diffusion of agricultural R&D 159
of development benefits 201
slow, of technological advances in agriculture 147, 152
disasters see 2007–2008 food crisis; conflicts; Covid-19 pandemic; famine; food crises; natural disasters; war
disease in animals and big data 54
cattle 52
conflict-related 78
Covid-19 pandemic 205
as happening regularly in localized areas 48
Malthus’ prediction of 10
impact of science and technology 146
in people conflict-related 76, 84
famine-related 16–17, 145
and income inequality 28
in plants as cause of famine 14
chemicals reducing damage caused by 4, 53, 161
resistance to 182
displacement
conflicts bringing about 75, 86–7
famine as cause of 22
of small farmers 201
domestic conflicts see conflicts
drought
and climate change 153, 154, 155
related to famine 14, 21, 40–41
and self-sufficiency 38, 44
supermarket response 22
and WFP’s activities in Somalia 86

Ehrlich, P.R. 185
eligibility
for charity in general 133
for food programmes 114
as political minefield 133
for use of food banks 9, 130–131
emergency food aid 65, 66, 69, 70, 72,
73, 131, 201
European Union (EU)
competing trade policies 58–9
controversy over GMOs 162, 173,
175, 183
distortionary policies 56
incentives to produce biofuels 152
loss of research capacity 173
regulatory regime for GMOs 179–80
response to Somalian seaborne
threat 86, 87
School Milk Scheme 113
subsidy war with US 59, 68, 71
surpluses generated by CAP 45, 58,
67, 68
ex ante 189, 190
Exogenous Shock Facility (ESF) 34
export restrictions 27, 30–31, 32, 33–5
export subsidies 35, 45, 56, 58, 59–60,
68, 71

famine
in China 14, 16–18, 40, 76–8
as failed food security 14, 128
and food aid 66
in Ireland 14, 16, 17, 39–40, 128–9
and Malthus 145, 171
Middle East 18
as most extreme outcome from
disruption in food availability
26

prevention of 19–23
reasons for 14–19, 38
recommendations for governments
23–4
reluctance of state to intervene 129
and self-sufficiency 39–41, 45
Stalin and Soviet Union 75–6
fast food restaurants 117, 118, 122, 124
feel-good factor 66
fiat, setting prices by 7, 92, 97–102,
104–5, 201
Food and Agricultural Organization
(FAO) 7, 28, 32, 33, 34, 144, 193
food aid
definition and conceptualization
65–6
emergency 65, 66, 69, 70, 72, 73,
131, 201
during famine 22, 66
and governments 102–3
in-kind 70–71, 72, 139–40
monetized 69–70, 114
non-emergency 66–7, 69, 70, 73
protection of shipments 85–8
from surplus disposal to cash
donations 66–73
use of food stamps for channelling
113–14
and war 8, 69
and WTO 34–5, 71–2
food banks
categories of people accessing
129–30
donations of food to 131–2
eligibility to use 9, 130–131
as extension of charitable tradition
of feeding poor 130
having limited resources 9, 130
and inadequate income problem 3,
9–10, 129–30, 135
increasing demands on 135
as largely dependent on volunteers
132–3
as method of dealing with food
insecurity 2
food crises
arising through broken food supply
chains 75
government efforts to deal with 30
impact of lowering domestic prices 30
reductions in aid offerings and concessionary sales in times of 103
rising food prices during 139 and self-sufficiency 40 in Somalia 86
speculation during 15 see also 2007–2008 food crisis
food deserts
absence of supermarkets 117, 118–22, 126
characteristics 125–6
definition 117
intervention to establish sources of supply 125, 126
introduction to 117–18
as market failure 117, 125
policies to address 122–5, 126
food emergency 69, 72, 73
food entitlements
targeted approach to 106–9, 115
US food stamp programme 109–13, 115
wider application of targeted policies 113–14, 115
food insecurity
adequate income
limitations of 9 as necessary to remove 8
brought about by relatively minor shocks 2
cash transfers for fighting 140
causing, in order to destabilize societies 86
and charities 133
extensive food as source of 92
and food deserts 118, 123, 125
and friction in international trade 49
household 137–9
image representing 2, 8
impact of food programmes 106, 109, 110
inadequate income as root of 140
and income policies 93–4, 137–9
as increasing when societies are poor 201
misidentification of source of 10
number of people experiencing 7
people likely to have concerns over 6
as problem that can be mitigated, but not eliminated 209
prospects for 2050 207
questions regarding African 202
societal methods of dealing with 2
as useful consumption-based indicator for poverty 138
see also food security
food policy 92–3
food prices
Covid-19 pandemic pushing up 206
and direct transfers of money to food consumers 139
and food policy 92–3, 94, 95
and food security 27–8
freezing 32
future implications of rising 207
impacts of food aid on 70, 71, 72
increasing incomes as possible solution to high 94–5
introduction to 97
and investment in R&D 189
moderated, due to high degree of substitutability 203
and new technologies 55
programmes increasing assistance in times of high 114
lowering 108–9
reallocation of US cropland leading to decline in 152
resulting from subsidy war 59
rising, as cause of hardship 26–8, 35, 44, 200
setting by fiat 7, 92, 97–102, 104–5, 201
subsidized 82, 97, 102–5, 108–9
in supermarkets 119, 124
and surpluses 44, 67–8
tomatoes 48–9
Ukraine-Russia war 208–9
in wake of collapse of Soviet Union 42–4
and weaponization of food 87
see also price spikes
food security
during conflicts 75–8, 88, 202
and Covid-19 pandemic 202–7
Food security

definition 7
ensuring, as multifaceted challenge 11
and food prices 27–8
future contribution of science to 172–6
future prospects 149, 200–202, 207–9
importance and fragility of 1–2
and income policy 93–5, 135–9
and poverty 91
role of international trade in providing 48–9
three pillars of 2–5
war as destroyer of 8, 75, 78–81, 88, 202
see also adequate income;
availability; food insecurity;
increasing agricultural productivity;
food stamps 2, 9–10, 109–14, 136–7
food weaponization 81–5, 87
friction
in food supply chains 62
in international trade in agriculture and food products 49–53, 60, 61, 62
size, configuration and speed of transport as source of 49–50
technology-based 49, 50–53, 62
funding
of agricultural R&D 159–60, 189–95
for food aid programmes 66, 103, 114
mixed approach 189–95
of research establishments 176, 193–4
venture capital 191–2
funds
check-off 194–5
distribution of 136, 201
for food aid, use of 69, 71, 114, 201
Live Aid, criticism of use of 41
relief payments 109
SNAP 111, 112
General Agreement on Tariffs and Trade (GATT) 34, 45, 58, 59–60, 68
General Agreement on Trade in Services (GATS) 59
genetic improvement 161–2, 164, 174–5
Genetically Modified Organisms (GMOs)
concerns over 174–5, 182–3
divergence in acceptance of 54, 175, 182–3
EU eschewing use of 162–3, 183
fierce resistance to 5
global bifurcation existing for 175
progress ensnared in controversies over 208
regulatory schism over use of 179–80
research establishments relocating as result of controversies over 173
terminology 162
transgenics as source of objections to 54
underpinning Green Revolution in developing countries 162
genetics see applied genetics
genomics 4–5, 54, 162–3, 175, 208
Green Revolution
basis of 4–5
and crop breeding 4–5, 53, 162, 180, 182, 185
lessons from 178–85, 188
proving Malthusian prediction wrong 185
rapid increase in productivity known as 53
recasting of rural finance for successful implementation of 178
role of social scientists 178, 179
and scientific rationality approach 180–181
social science component of 181–4, 185
guaranteed annual income (GAI) 135–9
guaranteed income supplement (GIS) 137, 138
hardship
causes of lead-up to 2007–2008 food crisis 32
rising food prices 26–8, 35, 44, 200
weather or disease-related shocks 43
changing perceptions of 94
export restrictions increasing 31
poor as suffering greatest 28, 29
programmes targeted at those suffering 33
turning into famine 39
harvests
failure of
and low fixed prices 100–101
and rising food prices 15, 27, 48–9, 103
and genetic research 10–11, 164
in Green Revolution 181, 182, 183
local, and starvation 23
and mechanization 153, 160, 161
prospects for 2050 183
in Somalia 86
and spoilage 3
subsistence farms 1, 182
wars and domestic conflicts 18–19
hoarding 15–16, 21, 79
hunger
arising from conflict-based food disruptions 75, 78, 80, 85, 86
borrowing to stave off 15–16
context 14
enduring once famine is overcome 23
food aid for overcoming 65
and neoliberalism 201
number of people suffering 7–8
programmes reducing 85, 86, 113, 115, 129
in-kind aid 70–71, 72, 139–40
inadequate income
and accessibility problem 91, 95, 135
in Canada’s indigenous communities, little interest in aspect of 94
during Covid-19 pandemic 203–4
example policies to handle problem of 3
and food banks 3, 9–10, 129–30, 135
relation to food insecurity 138, 140, 207
simplistic way of overcoming 8–9
and transfers of food aid 201
incentives
decision-makers in supply chains reacting to 6
to engage in hoarding 21
EU’s CAP 68
to increase production 102
for investment in research 10–11, 147, 165, 189, 193, 194–5
not to be a loser 149
of price gouging 97–8
to produce biofuels 152
to produce surpluses 72
for supermarkets in food deserts 123–4
to transport food products 20
income
direct enhancement of 139–40
increases in, as key to more competitive societies 201
losses of, as major threat to food security 203
low-income developing countries 28, 33, 200–201
low-income farmers 67
low-income neighbourhoods 117, 121
policies that increase 129–30
programme thresholds 110, 111
relationship with nutrition 125
sufficient and insufficient 91
income policy 93–5, 135–9
increasing agricultural productivity achieving
dependent on will and willingness to invest 209
as major remaining challenge 207
as complex process 147–8
conceptualization 10–11
dearth of scientific establishments to assist with 172–3
in development of new technology 174–5
as function of investment in R&D 209
and investment
by farmers 194
funding of network of
agricultural research
establishments in
developing countries
193–4
gaining new sense of urgency 208
important role of government
10–11, 147
as inhibited 176
lag between 167, 168, 208
as necessary condition for 159, 166, 168, 209
in new technologies 175
as key to providing global food
security 151, 156
as long-run process 5
main sources of 4–5
and Malthus 10, 146, 148
in modern market economies 173–4
need to 3, 144
objections to some activities 11, 208
as pillar of food security 3, 48
plant and animal breeding 53–4
role of social science 178–81, 185
role of ‘tinkerers’ 146–7
scientific discoveries underpinning
171
sources of concern 148, 149
two constraints limiting 188

see also applied chemistry; applied
 genetics; Green Revolution;
mechanization
information flow 20, 22, 182
insect pests
and applied chemistry 4, 53, 161, 164, 171
and applied genetics 54, 174, 182
and big data 54
changes in farming practices 181
and climate change 154
in relation to famine 14
science-based innovations to control
172
and self-sufficiency 38, 44
and spoilage 3
war leading to inability to control 19

insufficient income see inadequate income
International Bank for Reconstruction
and Development (IBRD) 57–8
International Centre for Tropical
Agriculture (CIAT) 193
international cooperation 32, 33–5
International Crop Research Institute for
the Semi-Arid Tropics (ICRISAT) 173
International Institute of Tropical
Agriculture (IITA) 193
International Livestock Research
Institute (ILRI) 173
International Maize and Wheat
Improvement Centre (CIMMYT) 173, 180, 193
International Monetary Fund (IMF) 34, 57
International Potato Center (CIP) 173
International Rice Research Institute
(IRRI) 173, 193
International Service for the Acquisition
of Agri-Biotech Applications
(ISAAA) 162
international trade
distortions in agri-food products
55–6, 61
as efficient in response to market
forces 200
food aid in relation to 65, 70, 72, 73
friction in 49–53, 60, 62
impact of agricultural trade 60
impact of shocks
and concerns over ability to
respond to 61–2
and options for supplementing
trade flows 60–61
no rules of trade prior to end of
Second World War 56–7
role in providing food security 48–9, 62
small scale of, during Irish famine
40
as source of conflict 58
International Trade Organization (ITO) 58
investment
in agricultural R&D
China’s large-scale 172
and climate change 5
as declining 166, 167, 168
lag between 167
related to mechanization 163–4
sources of 159–60, 189–95
underinvestment 165–6, 208
in agricultural technology 148, 163–5
CGIAR 173
and climate change 5, 153, 156, 208
in development of new technology 5, 54, 163–5, 175, 184
and farmers 10–11, 19, 194
from government 5, 10–11, 146, 147, 159, 164–5, 184, 189–94, 195
in increasing agricultural productivity 147, 159, 166–8, 175, 176, 193–4, 208, 209
in infrastructure to move food 52, 62
in irrigation 183–4
lag with productivity increases 167, 168
from private sector 5, 146, 159–60, 163–4, 165, 176, 189–93, 195
Irish famine 14, 16, 17, 39–40, 128–9
Japanese agricultural protectionism 30–31
junk food 110, 117, 124
labour participation 136
lags between commitment of investment and commercial returns from marketplace 147
in crop production and transportation 206
in farmers’ adoption of new technologies 55
between investment and increasing agricultural productivity 167, 168, 208
leakages 9, 93–4, 107–9, 112, 113, 114, 136–7
Live Aid 41
living off the land 79–80
local foods preference for 41, 45
pressure from advocates of 23–4
prices for 70
shortages in 15
local production expanding 20
and famine 14, 19–20
and modern agri-food supply chains 207
reliance on 38
and self-sufficiency 38–45
shocks to 45
Somalia characterized by disrupted 86
local shocks 38, 40, 45, 48
malnutrition in 2007–2008 food crisis 32
as chronic in many parts of world 66
and cropping patterns 23
foods warding off, as relatively expensive 28
forms of 26
largely met objective of reducing 115
recipients of non-emergency food aid at risk of 70
rich people suffering from 93
Malthusian trap escaping 10–11, 148–9, 171
explanation 144–5
keeping at bay 163
limitations to theory 10, 146–8
solution to 209
mechanization impact on climate change 153
importance of 175–6
investment related to 163–4, 174, 189
reduced need for draught animals 160
as replacing renewable resources 152–3
side benefit of 151–2
as source of increasing productivity 4, 159, 160–161, 167
as technological driver of change in agriculture 53
as underway in 1920s 57, 171
Mercals (people’s markets) 82–3, 93
Middle East famine 18
military 18–19, 75, 79–80, 82, 83–4, 86
Food security

monetized food aid 69–70, 114
moral hazard 131

National School Lunch Program (NSLP) 113
natural disasters 69, 76, 85, 88, 106, 202
necessary condition
  for famine, disruption to local food production as 14
  for food security, availability of food as 8, 151
  for increasing agricultural productivity
    investment as 159, 166, 168, 209
    scientific improvement to crops as 179
  for offsetting increases in food demand, increases in agricultural productivity as 167
  science as only 171–6
  for solving poor nutrition and related health problems, removing accessibility constraint as 125, 126
negative income tax 135–6
net food importing developing countries (NFIDC) 60, 61
NGOs see Non-Governmental Organizations (NGOs)
on-emergency food aid 66–7, 69, 70, 73
Non-Governmental Organizations (NGOs)
in conflict and war 8, 85, 86
food banks often run by 9
and monetized food aid 69–70
policy makers turning responsibility for food aid onto 6–7
as sometimes promoting policies encouraging self-sufficiency 40
struggle with provision of universal access to food 91
North Atlantic Treaty Organization (NATO) 87
nutrient deficiency 26
nutrition
  and cereal-based diets 72
  curtailment during price spikes 28
effect of moving accessibility constraint 125, 126
and food deserts 125–6
and junk food 117
plant 193
procurement challenges 72–3
question regarding nutritional content offered by programmes 111, 113, 115
rich people achieving acceptable level of 135
and supermarkets 118, 122
women and children, programmes supplementing 67
see also malnutrition

Old Age Security (OAS) 137, 138

Peel, Robert 16, 39, 129
population
  2050’s expected peak 207, 208
  of Britain in 19th century 51
  distribution of food to Somalian 86–7
  as ever-increasing 3
  experiencing food insecurity 7
  experiencing hunger 7–8
  and famines 18, 22, 39, 40
  growth projections 10, 144–6, 148–9, 167, 176
  massive increase over 200 years 209
poverty
  of farmers 55
  guaranteed annual income seen as means to reduce 135–9
  Irish 129
  leading to problems in accessibility to food 140
  Malthus on lower classes and 148
  neoliberalism failing to lift societies out of 201
  policy for 91–5
  as possible to mitigate, but not eliminate 209
  programme thresholds 110, 111, 114
  programmes as only attempting to offset damage done by 115
  as ‘wicked problem’ 154
see also food deserts
price gouging 97–8
price spikes
  affecting people in different ways 28
  arising from local shocks to
  agricultural production 38
  long-term effects 28
  managing 29–35, 114
  short-run 27
prices see food prices
private sector see investment: from
  private sector
productivity see agricultural productivity;
  increasing agricultural productivity
projections
  of Malthus 10, 144–6, 148–9
  of population growth 10, 144, 149,
  167, 176
public sector see investment: from
  government
queues 32, 98–9
raising incomes
  directly 139–40
  evidence 135, 139, 140
  and leakages 136–7
  policies for 135
rationing 33, 99–100, 114
refugees 22, 69, 78–9, 84, 86–7, 98, 202
regulation 54, 161, 163, 179–80, 183,
  191, 208
research and development (R&D)
  see agricultural research and
  development (R&D)
resilience
  of agricultural trade to disruptive
  shocks 60
  of crops 20, 209
  of supply chains 202–3, 204–5, 207
resources
  direct transfers of financial 139–40
  and famine 16, 22–3
  following war 80
  food banks having limited 130, 131
  hoarding 15
  impact of wars, conflicts and natural
  disasters 202
increasing food production from
  traditional 94
  limited, of food banks 9, 130
  for monitoring families 107
  panic buying exhausting 21
  rationing 33
  scramble to acquire, causing Second
  World War 57
  and setting prices by fiat 100
  sufficient 8, 10, 27, 91
  wasting 44, 185
  weaponization of food to free up 87
  World Bank transferring from rich
to poor countries 58
rice 27, 30, 60, 103, 110, 182, 183–4,
  193
risk analysis framework (RAF) 180
Russell, Lord John 16, 39, 129
School Fruit and Vegetables Scheme
  (SFVS) 113
School Milk Scheme 113
scientific advances
  in agriculture 171–2
  future contribution to food security
  172–6
  issues with acceptance of 54, 175,
  176, 182–3
scientific agriculture
  context 159–63
  investment in technology 163–5
  lag between investment and
  productivity 167
  underinvestment in R&D 165–6
scientific discoveries 171–2
scorched earth strategies 80
Second World War
  contribution of applied chemistry
  following 161
  food surpluses 69, 109–10
  increasing food production during
  42
  innovations in transport and logistics
  following 52
  mechanism for negotiating high
  tariffs down 58
  no international rules of trade prior
to end of 56
  scramble to access resources as
  precursor of 57
self-sufficiency
and developing countries’ trade barriers 31
dispelling myth of 39–43, 45
effects of governmental efforts to promote 20–21, 23–4, 38, 52
impact of restricting trade 200, 201
import-dependent countries giving greater emphasis to 31
lack of effectiveness as food security strategy 43–5
leading to relative isolation 23
possible reasons for pursuing 45
recommendation for alternatives to 38
storage as less distortionary than 61
shipments of food, protection of 85–8
shocks
and emergency food aid 66
emergency responses to 32, 34
example of external 151–2
famines arising from 17–18, 21, 23,
38, 39
to food security, as common in China 40
global food system remaining vulnerable to convergence of 35
income or expenditure 138
increasing local food prices 48
and international trade 60, 61–2
local 38, 40, 48
moving markets in disequilibria, future paths for 32
possibly driving up costs of imports 103
in relation to Arab Spring 44
relatively minor, bringing about food insecurity 2
and self-sufficiency 38, 40, 41, 43,
44, 45
supply 40–41, 48, 208–9
see also 2007–2008 food crisis;
Covid-19 pandemic
short-run demand 15–16, 21
shortages
during Covid-19 pandemic 26–7,
203, 205
importing foodstuffs to address 102
labour 132, 206
localized 200
low prices exacerbating 100–102
rationing addressing 99–100
responses to 15, 16, 22
subsidization of food prices overcoming 102
wartime 42
SNAP see Supplemental Nutritional Assistance Program (SNAP)
social science
component of Green Revolution 181–4, 185
role in increasing agricultural productivity 178–81, 185
Soviet Union 42–3, 75–6, 98
speculation 15, 21, 27
speculative risks 174, 188
spoilage 3, 53
starvation
arising from conflict-based food disruptions 75–6, 79, 80,
83–4
charities preventing 2, 128
context 14
definition 26
Ehrlich’s prediction of 185
element of use of food as means of coercion 82
and famine 16, 128, 129
food aid for overcoming 65
little research on effects of 17
locust attack resulting in 18
Malthus’ prediction of 10, 148
and negative income tax 136
as often due to incompetency and underestimation of required
resources 8
people fleeing from 22
slaughter of buffalo leading to 81
and slaughtering of livestock 23
slow, consequences of 28
stockholdings 38, 60–61, 86
stunting 26
subsidies
acquisitions of stockholdings 61
actionable 71
agricultural 61, 71
amber box 71, 72
domestic support 59–60
export 35, 45, 56, 58, 59–60, 68, 71
farm inputs 92, 179
food price 82, 97, 102–5, 108–9
food retail 94
government 43–4
green box 71–2
impacts of 33
interest rates, on loans 123
as mechanism to deal with surpluses 45, 71–2
non-actionable 71–2
as policy instrument 6
red box 71, 72
school lunch 113
subsidy schemes 61, 109
subsidy war 59, 68, 71
subsistence farms 1, 6, 178, 182, 183
supermarkets
ability to arbitrage away local food disruptions 21–2
absence from food deserts 117, 118–22, 126
controlling leakage 107
during Covid-19 pandemic 26–7, 204
metaphor 2–3, 8, 91
striving for consistent product availability 3
substitutions 22, 49
travelling to 118
as typically carrying wide variety of food products 117
Supplemental Nutritional Assistance Program (SNAP) 109, 110–113, 114
supply chains
and availability 6–7
food wastage in typically long 3
and Green Revolution 178–9, 181, 182, 183
impact of wars and conflicts 75, 78, 79, 86–7
modern farming as phase of 19
response to shocks 60, 62
of retailers 92
as skilled at exploiting arbitrage opportunities 48–9
Ukraine-Russia war 209

in wake of collapse of Soviet Union 42–3
surpluses
disposal of 44–5, 66–73
distribution to poor via food banks 131–2
via food stamp programme 109
EU and CAP 58
GATT and farmers 58
of processed government cheese 93
and secondary markets 70, 100
and self-sufficiency 43, 44–5
of supermarkets 3
targeted policies
context 106–9
responses to rising food prices 32
wider application of 113–14, 115
targeted programmes 33, 109–13, 115, 135, 136–7
Tariff Rate Quota (TRQ) 59
technology see agricultural technology; investment: in development of new technology
tomatoes 48–9
trade see agricultural trade; international trade
trade barriers
and agriculture 57
to drive imports to zero on food staples 44
for farmers’ economic protection 31
and flow of food 62
post-crisis 30
progress made in reducing, yet agricultural trade remaining distorted 52–3
removing, as policy instrument 7
and surpluses 45
trade agreements as mechanism to reduce 56
Trade Related Aspects of Intellectual Property (TRIPS) 59
trafficking 112
transgenics 5, 54, 162–3, 174, 175, 191
transportation
air 108, 159
available technology for, as source of friction 49
and Covid-19 pandemic 206
effect of harnessing gasoline and diesel power for 171
as environmentally unfriendly 71
government intervention of subsidizing 92
impact of lower cost of 21
inability of, as representing frictions in food system 52
and incomes policy in Canada 94
major changes to, requiring government acquiescence 183
post-war period of innovations in 52
public 118
in times of war and conflict 79, 84, 202
underinvestment in networks as underlying source of famine 20
transportation infrastructure
conditions for non-development 20–21
in conflict and war 80
as essential for efficient working of arbitrage 20
and famine 17, 20–21, 23, 40–41, 77
and self-sufficiency 20–21, 38, 40, 41
time required to plan and expand 183
Trussell Trust (TT) 130–131
Ukraine-Russia war 2, 27, 32, 152–3, 202, 208–9
underinvestment
in agricultural R&D 165–6, 167, 173, 188, 195, 208
in transportation networks 20
underweight 26
United Nations (UN)
established to deal with political conflict 57
population projections 10
refugee camps operated by 87
see also Food and Agricultural Organization (FAO); World Food Programme (WFP)
United States Department of Agriculture (USDA) 67, 109–10, 112, 119, 164
US food stamp programme 9, 109–14
volunteers 131, 132–3
vulnerability
in Africa 202
due to increasing food prices 29
and flow of food 62
of global food system to convergence of shocks 35
of poor 129–30, 138
of programmes 115
and self-sufficiency 20–21, 45
of supply chains 79, 204, 207
war
as cause of disruption in agricultural production 18–19
as destroyer of food security 8, 75, 78–81, 88, 202
emergency food aid provided in wake of 69
famine during 18
food aid NGOs 8, 85, 86
self-sufficiency as no protection against 38
see also conflicts; Second World War; Ukraine-Russia war
wasting 26
weaponization of food 81–5, 87
wheat
bioethanol consumption equivalent 153
decline in consumption replaced by imports 60
Egypt’s Arab Spring 104
export restrictions 30
landraces 161
plant breeding centres 164
research centres 173, 193
research work 180–181
staple prices 27
subsidies 103, 104
Ukraine-Russia war 208–9
Women’s Land Army (WLA) 42
World Bank 34, 38, 57–8, 193
World Food Programme (WFP) 34, 72–3, 85–8
World Trade Organization (WTO) 34–5, 45, 59–60, 61, 68, 71–2