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PUBLIC FOOD PROCUREMENT FOR SUSTAINABLE FOOD SYSTEMS AND HEALTHY DIETS

VOLUME 1

PUBLIC FOOD PROCUREMENT FOR SUSTAINABLE FOOD SYSTEMS AND HEALTHY DIETS

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FOREWORD

Sustainable public procurement is a key instrument to work towards the achievement of the Sustainable Development Goals, and fits into the collective efforts and multisector approaches of the United Nations 2030 Agenda for Sustainable Development. This book is the result of the collaboration between the Food and Agriculture Organization of the United Nations and the research sector, and compiles contributions from internationally renowned scholars working in the field of public food procurement. It explores the multiple benefits that public food procurement can bring to various beneficiaries and analyses how it can contribute towards sustainable food systems and healthy diets.

Sustainable public food procurement has the potential to impact both food consumption and food production patterns. It may enhance access to healthy diets for consumers of publicly procured food (such as schoolchildren) and promote the development of more sustainable food systems (through its demand and spillover effects). Sustainable public food procurement also has the potential to decrease rural poverty by stimulating the development of markets, providing a regular and reliable source of income for smallholder farmers and helping these farmers overcome barriers that prevent them from enhancing their productivity.

The international recognition of sustainable public procurement – including food procurement – as an instrument for development goes back to the United Nations Conference on Sustainable Development of 2012 (and the subsequently formulated Sustainable Development Goals) and the Second International Conference on Nutrition of 2014. Other global platforms, such as the Committee on World Food Security and the Global Panel on Agriculture and Food Systems for Nutrition, have also recognized sustainable public food procurement as an instrument for development.

In addition, sustainable public food procurement has been included among the key concrete actions to foster the transformation of the world's food systems that was discussed at the 2021 United Nations Food System Summit. Sustainable food procurement is closely linked with school meal programmes, and especially with home-grown or similar school feeding programmes designed to provide schoolchildren with safe, diverse and nutritious food that is partially sourced from local smallholders. In 2021, school meal programmes also received considerable attention in the run-up to the United Nations Food System Summit. For example, a worldwide coalition on school feeding was created with the ambition to carry on outcomes from the summit for sustained impact.

Considering the current threats to our food systems (including the Covid-19 pandemic), this book comes at a very timely moment. It provides evidence that may not only stimulate the international debate on the topic, but also support the practical implementation of sustainable public food procurement initiatives at national, regional and local levels. With contributions from North and South America, Europe, Asia and Africa, the book is a useful tool for researchers, policymakers and development partners working in low-, medium- and high-income country contexts.

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PREFACE

The publication "Public food procurement for sustainable food systems and healthy diets" is divided into two volumes. It discusses public food procurement (PFP) initiatives designed with the objective of advancing social, economic and environmental development through government purchases. Often referred to as "institutional procurement," PFP has been receiving increased attention in the literature and from policymakers and development agencies over the past decades; it is seen as an important policy instrument that has the potential to deliver multiple benefits to a multiplicity of beneficiaries and influence both food consumption and food production patterns. PFP is also increasingly recognized as an important entry point for policymakers to build more sustainable food systems and promote healthy diets. PFP initiatives include school feeding programmes, as well as the purchase of food for public universities, hospitals, prisons and social programmes.

These two volumes are the result of the collaboration between the Food and Agriculture Organization of the United Nations (FAO), the Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT) and the Federal University of Rio Grande do Sul (UFRGS).

The idea for this publication arose during the workshop "Institutional Food Procurement and School Feeding Programmes: Exploring the Benefits, Challenges and Opportunities", organized in 2018 in the framework of the Third International Conference on Agriculture and Food in an Urbanizing Society, hosted by UFRGS in Porto Alegre, Brazil. The workshop brought together academics and practitioners with different areas of expertise and backgrounds to explore the multiple facets of PFP. The discussions brought to light the transdisciplinarity of the topic, the complementarity between

practical experiences and academic analysis – and the absence of a comprehensive publication analysing the multifaceted nature and development potential of PFP from different perspectives. This publication is based on the papers presented during the workshop, but goes beyond those papers to offer – for the first time - a comprehensive and extensive analysis of PFP. Leading scholars and practitioners from around the world were invited to contribute to the analysis of the use of PFP initiatives as a policy instrument to achieve multiple development objectives and, in particular, to help build sustainable food systems that offer healthy diets.

The two volumes and 35 chapters of this book were written by more than 100 authors, including academics, United Nations staff and practitioners. **Volume 1** analyses the use of PFP as a development tool, thereby placing it within the broader debate on sustainable public procurement and the United Nations Sustainable Development Goals. The volume explores PFP's multiple potential benefits and beneficiaries, taking into consideration the three pillars of sustainability, i.e. the social, economic and environmental pillars. It argues that PFP can provide support for agricultural production by local and smallholder farmers, promote the conservation and sustainable use of agrobiodiversity, and improve the nutrition and health of communities.

Based on examples and experiences with PFP in 32 countries in Africa, Asia, Europe and North and South America, **Volume 2** offers extensive evidence of the instruments used to implement PFP, enablers and challenges. It aims to provide useful lessons to policymakers and practitioners involved in the design and implementation of PFP policies and initiatives.

Hopefully, this book will also help researchers analyse PFP further. Ultimately, it aims to contribute to the improved understanding, dissemination and use of PFP as a development tool. Although the idea for this book preceded the COVID-19 pandemic, its publication during this pandemic is timely. In the search for answers to this crisis, public procurement and policies that aim to strengthen PFP linkages with local production are receiving more attention than ever, not only as a tool for recovery but also as an opportunity to set an example and take the right track towards more sustainable modes of consumption and production.

ACKNOWLEDGEMENTS

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ABBREVIATIONS AND ACRONYMS

10YFP	10 Year Framework of Programmes [on Sustainable Consumption and Production Patterns]
AIV	African indigenous vegetables
AO	appellation of origin
APPIH	association of fish producers of Honduras (*Asociación de Productores Piscícolas de Honduras*)
ASF	animal-sourced food
ATER	technical assistance and rural extension [system] (Brazil) (*Assistência Técnica e Extensão Rural*)
B2B	business-to-business
B2G	business-to-government
BCC	behaviour change communication
BFN	Biodiversity for Food and Nutrition [project]
CA	conservation agriculture
CACP	Commission for Agricultural Costs and Prices (India)
CAE	School Food Council (Brazil) (*Conselho de Alimentação Escolar*)
CASU	Conservation Agriculture Scale-Up [project] (Zambia)
Ceasas	food supply centres (Brazil) (*Centrais de Abastecimento*)
CECANEs	Collaboration Centres on School Food and Nutrition (Brazil) (*Centros Colaboradores em Alimentação e Nutrição do Escolar*)
CELAC	Community of Latin American and Caribbean States
CESCR	United Nations Committee on Economic, Social and Cultural Rights
CG PNAE	interministerial governing committee of the National School Feeding Programme (Brazil) (*Comitê Gestor Interministerial do Programa Nacional de Alimentação Escolar*)
CIALCO	alternative marketing circuits (Ecuador) (*Circuitos Alternativos de Comercialización*)
CIAT	International Center for Tropical Agriculture

CNP	Child Nutrition Program (United States of America)
COMESA	Common Market for Eastern and Southern Africa
Conab	National Supply Company (Brazil) (*Companhia Nacional de Abastecimento*)
Consea	Food and Nutrition Security National Council (Brazil) (*Conselho Nacional de Segurança Alimentar e Nutricional*)
DINARA	national directorate for aquatic resources (Uruguay) (*Dirección Nacional de Recursos Acuáticos*)
DNCS	national directorate for school feeding (Cote d'Ivoire) (*Direction nationale des cantines scolaires*)
EAS	service provision entitities (Colombia) (*Entidades Administradoras de Servicios*)
EMATER	Technical Assistance and Rural Extension Agency (Brazil) (*Empresa de Assistência Técnica e Extensão Rural*)
Embrapa	Brazilian Agricultural Research Corporation (*Empresa Brasilera de Investigación Agropecuaria*)
Endes	National Economic and Social Development Strategy (Brazil) (*Estratégia Nacional de Desenvolvimento Econômico e Social*)
EPAGRI	agricultural research and rural extension agency of Santa Catarina (Brazil) (*Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina*)
EPSEP	agency for fisheries services of Peru (*Empresa Peruana de Servicios Pesqueros*)
ERSU	regional entity for the right to university study (Italy) (*Ente Regionale per il Diritto allo Studio Universitario*)
ESN	Food and Nutrition Division (of the Food and Agriculture Organization of the United Nations)
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FARC-EP	Revolutionary Armed Forces of Colombia-People's Army (*Fuerzas Armadas Revolucionarias de Colombia-Ejército del Pueblo*)
FBS	farmer business school
FBSSAN	Brazilian Forum for Food Sovereignty and Food and Nutritional Security (*Fórum Brasileiro de Soberania e Segurança Alimentar e Nutricional*)
FCI	Food Corporation of India
FFL	Food for Life
FFLP	Food for Life Partnership

FIES	food insecurity indicator
FNDE	National Fund for Educational Development (Brazil) (*Fundo Nacional de Desenvolvimento da Educação*)
FNP	National Front of Mayors (Brazil) (*Frente Nacional de Prefeitos*)
FNS	food and nutrition security
FPSAN	Parliamentary Front on Nutrition and Food Security (Brazil) (*Frente Parlamentar de Segurança Alimentar e Nutricional*)
FPSF	food price stabilization funding (China)
FSA	food supply agreement
FSC4D	Food Smart Cities for Development
FTC	fixed transaction cost
FUNAI	federal foundation for Indian affairs (Brazil) (*Fundação Nacional do Índio*)
GDP	gross domestic product
GEF	Global Environment Facility
GHG	greenhouse gas
GI	geographical indication
GMO	genetically modified organism
GPA	Agreement on Government Procurement (World Trade Organization)
GPP	green public procurement
GPP NAP	National Action Plan on Green Public Procurement (Italy)
GPPnet	Green Public Procurement Network
GSFP	Ghana School Feeding Programme
HACCP	hazard analysis and critical control points
HGSF	home-grown school feeding
HGSM	Home-Grown School Meal [programme] (Kenya)
HLPE	High-Level Panel of Experts on Food Security and Nutrition
IBGE	Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatistica*)
ICBF	Colombian Family Welfare Institute (*Instituto Colombiano de Bienestar Familiar*)

ICC	intra-cluster correlation
ICT	information and communication technology
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IFPSF	institutional food procurement for school feeding
IFS	institutional food services
IHMA	Honduran Agricultural Market Institute (*Instituto Hondureño de Mercadeo Agricola*)
ILO	International Labour Organization
INFOODS	International Network for Food Data Systems
INFOPESCA	Centre for Marketing Information and Advisory Services for Fishery Products in Latin America and the Caribbean
INPEC	National Penitentiary and Prison Institute (Colombia) (*Instituto Nacional Penitenciario y Carcelario*)
IQ COSAN	food and nutrition security quality index
ISMEA	institute for services to the agricultural food market (Italy) (*Istituto di Servizi per il Mercato Agricolo Alimentare*)
ISO	International Organization for Standardization
ITP	technological fisheries institute (Peru) (*Instituto Tecnológico Pesquero*)
JAC	community action boards (Colombia) (*Juntas de Acción Comunal*)
LAC	Latin America and Caribbean [countries]
LFP	Local Food Plus (Canada)
LM	local multiplier
LOC	local [service model]
LOC-ORG	local organic [service model]
LOW	low-cost [service model]
MAGA	Ministry of Agriculture, Livestock and Food (Guatemala) (*Ministerio de Agricultura, Ganadería y Alimentación*)
MANA	food and nutrition improvement plan of Antioquia (Colombia) (*Plan de Mejoramiento Alimentario y Nutricional de Antioquia*)

MAPA	Ministry of Agriculture, Livestock and Supply (Brazil) (*Ministério da Agricultura, Pecuária e Abastecimento*)
MDE	minimum detectable effect
MEAT	most economically advantageous tender
MHMR	PreK-12 School Food: Making It Healthier, Making It Regional [project]
MINEDUC	Ministry of Education (Guatemala) (*Ministério da Agricultura, Pecuária e Abastecimento*)
MPAS	Millet Procurement Automation System (India)
MSC	Marine Stewardship Council
MSP	minimum support price (India)
MSPAS	Ministry of Public Health and Social Assistance (Guatemala) (*Ministerio de Salud Pública y Asistencia Social*)
NCD	non-communicable disease
NFSA	National Food Security Act (India)
NGO	non-governmental organization
NSLP	National School Lunch Program (United States of America)
NUS	neglected and underutilized species
OECD	Organisation for Economic Co-operation and Development
OIE	World Organisation for Animal Health
OMAFRA	Ontario Ministry of Agriculture, Food and Rural Affairs
OPAC	Assessment body for participatory conformity (Brazil) (*organismo participativo de avaliação da conformidade*)
OPN	One Planet Network
ORG	organic [procurement model]
P4P	Purchase for Progress
PAA	Food Purchase Programme (Brazil) (*Programa de Aquisição de Alimentos*)
PAA	Purchase from Africans for Africa (World Food Programme)
PAE	School Food Programme (Dominican Republic, Honduras, Paraguay, Peru) (*Programa de Alimentación Escolar*)
PAE	School Feeding Programme (Colombia) (*Programa de Alimentación Escolar*)

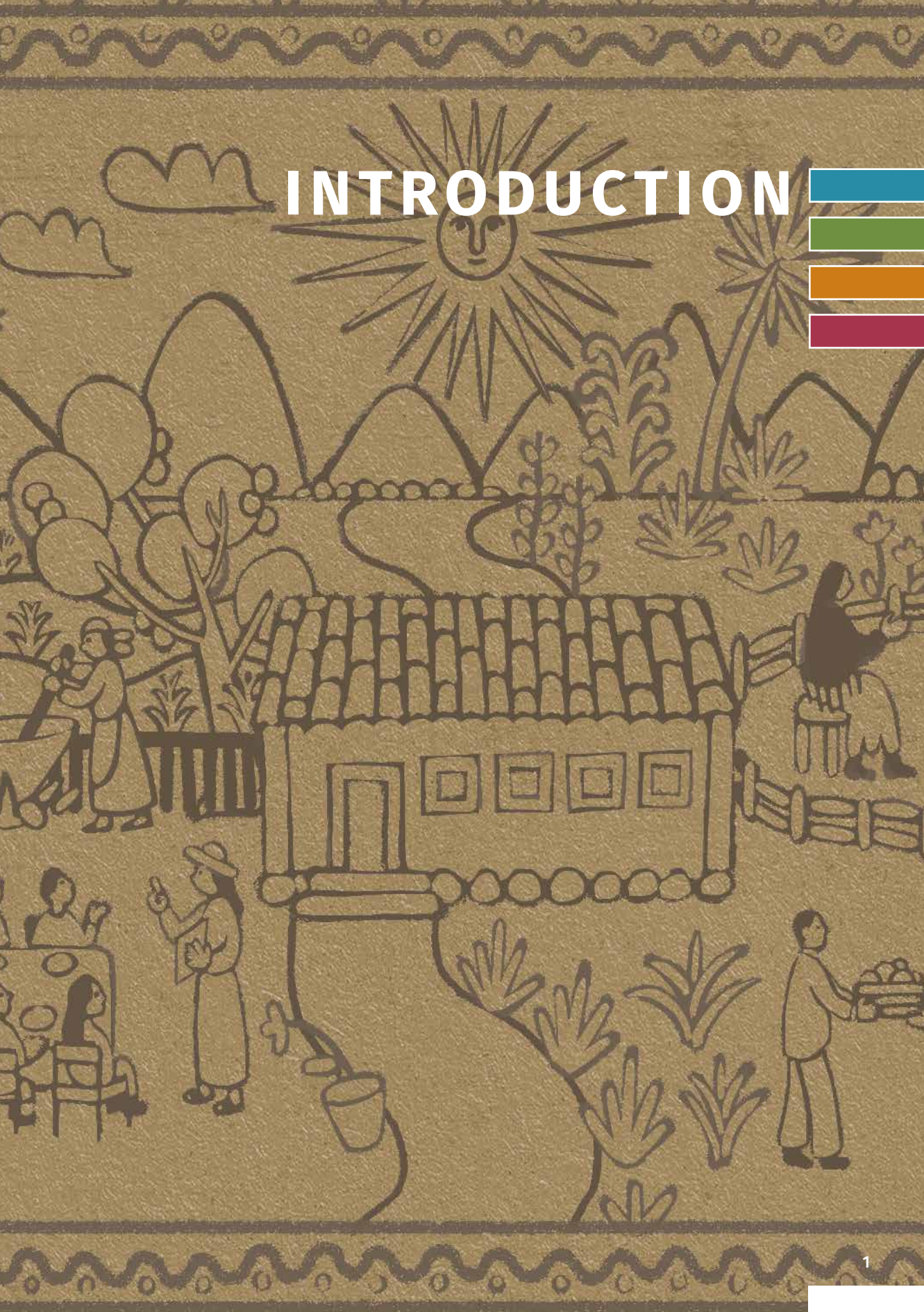
PAFFEC	family agriculture programme to strengthen the peasant economy (Guatemala) (*Programa de Agricultura Familiar para el Fortalecimiento de la Economía Campesina*)
PAPERS	plan for ecological public purchasing of the region of Sardinia (Italy) (*Piano per gli Acquisti Pubblici Ecologici della Regione Sardegna*)
PCA	principal component analysis
PDO	protected designation of origin
PDS	Public Distribution System (India)
PEHEG	Educating with School Gardens and Gastronomy (Brazil) (*Projeto Educando com a Horta Escolar e a Gastronomia*)
PFP	public food procurement
PGI	protected geographical indication
Planapo	National Plan on Agroecology and Organic Production (Brasil) (*Plano Nacional de Agroecologia e Produção Orgânica*)
Plansan	National Plan for Food and Nutritional Security (Brasil) (*Plano Nacional de Segurança Alimentar e Nutricional*)
PNAE	National School Feeding Programme (Brazil) (*Programa Nacional de Alimentação Escolar*)
PNAN	National Food and Nutrition Policy (Brazil) (*Política Nacional de Alimentação e Nutrição*)
PNATER	National Policy of Technical Assistance and Rural Extension (Brazil) (*Política Nacional de Assistência Técnica e Extensão Rural*)
POPP	public organic procurement policy
Pronaf	National Programme for Strengthening Family Agriculture (Brazil) (*Programa Nacional de Fortalecimento da Agricultura Familiar*)
PRONATER	National Programme of Technical Assistance and Rural Extension (Brazil) (*Programa Nacional de Assistência Técnica e Extensão Rural*)
PSE	School Health Programme (Brazil) (*Programa Saúde na Escola*)
PSU	primary sampling unit
RCT	randomized control trial
RDA	recommended dietary allowance
REAF	Specialized Meeting on Family Farming [of Mercosur] (*Reunión Especializada de Agricultura Familiar*)

RFP	request for proposals
S2F	Strength2Food
SDG	Sustainable Development Goal
SEBRAE	Brazilian Micro and Small Business Support Service (*Serviço Brasileiro de Apoio às Micro e Pequenas Empresa*)
SF	school feeding
SFA	school food authority
SFP	school feeding programme
SFS	sustainable food systems
SHG	self-help group
SIBBR	Brazilian Biodiversity Information System (*Sistema de Informação sobre a Biodiversidade Brasileira*)
SiGPC	accountability management system (*Sistema de Gestão de Prestação de Contas*) (Brazil)
SINGI	Sustainable Income Generating Investment Group
SISAN	National Food and Nutrition Security System (Brazil) (*Sistema Nacional de Segurança Alimentar e Nutricional*)
SMC	school meals committee (Kenya)
SMEs	small and medium enterprises
SMEs	small and microenterprises (Ethiopia)
SNNPR	Southern Nations, Nationalities and People's Region (Ethiopia)
SPP	sustainable public procurement
SROI	social return on investment
SSA	sub-Saharan Africa
SSC	school support committees (Cambodia)
SSU	secondary sampling unit
SU	Sichuan University
SY	school year
TFPC	Toronto Food Policy Council
TLU	tropical livestock unit

TPDS	Targeted Public Distribution System (India)
TRIPs	[Agreement on] Trade-Related Aspects of Intellectual Property Rights
TSG	traditional specialty guaranteed
UIFS	university institutional food services
UN	United Nations
UNCITRAL	United Nations Commission on International Trade Law
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNICEF	United Nations Children's Fund
USDA	United States Department of Agriculture
UVG	Universidad del Valle de Guatemala
VAT	value added tax
VFM	Virtual Farmers' Market
WFP	World Food Programme
WHO	World Health Organization
WTO	World Trade Organization

BRL	Brazilian real
CNY	Chinese renminbi
COP	Colombian peso
EUR	Euro
GBP	British Pound
GTQ	Guatemalan Quetzal
INR	Indian rupee
KES	Kenyan shillings
USD	United States Dollar

INTRODUCTION



PUBLIC FOOD PROCUREMENT AS A GAME CHANGER FOR FOOD SYSTEM TRANSFORMATION

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1. Overview

Over the past decade, national, regional and local governments in various low- to high-income countries have been developing public food procurement (PFP) initiatives that use public purchasing power and a regular demand for food as a policy instrument to promote sustainable development. These initiatives – often referred to as institutional food procurement – include school feeding or school meal programmes,[1] as well programmes whereby food is purchased for public hospitals, prisons, universities and cafeterias, and other social programmes. Such initiatives are increasingly being recognized as an important "game changer" – an entry point to promote the development of more sustainable food systems and the adoption of healthy diets (Foodlinks, 2013; De Schutter, 2015; High Level Panel of Experts on Food Security and Nutrition [HLPE], 2017; Willet *et al.*, 2019; Swensson and Tartanac,

[1] The terms school feeding and school meal programmes are used interchangeably in this publication. They refer to programmes that provide food to children or their households through schools, or that are conditional on school attendance. Such programmes provide meals, snacks or conditional household transfers in the form of cash, vouchers or in-kind take-home rations. There are different models of school feeding; these models may integrate other components, such as a home-grown school feeding component (which is analysed in various chapters of this publication).

2020; World Health Organization [WHO], 2021; Food and Agriculture Organization of the United Nations [FAO] and World Food Programme [WFP], 2018; FAO, 2019; Steiner, 2021; Carducci *et al.*, 2021, World Committee on Food Security Committee [CFS], 2021; International Panel of Experts on Sustainable Food Systems [IPES-Food], 2016; Marshall *et al.*, 2020).

Depending on policy and regulatory frameworks,[2] PFP initiatives can determine:

i. what kind of food will be purchased (e.g. local, diverse, nutritious, healthy or culturally acceptable food);

ii. from whom it will be purchased (e.g. from local or smallholder farmers, small and medium food enterprises, or women, youth or other vulnerable producers' groups); and

iii. from what type of production it will be purchased (e.g. from agricultural production that ensures environmental sustainability and the conservation of biodiversity) (Swensson, 2018; Tartanac *et al.*, 2019; Swensson and Tartanac, 2020).

Considering the extent of the demand for food from the public sector, PFP initiatives have the potential to profoundly influence both food consumption and food production patterns and to deliver multiple social, economic and/or environmental benefits to a multiplicity of beneficiaries, including the producers and consumers of publicly procured food and the wider community (Morgan and Sonnino, 2008; Foodlinks, 2013; Fitch and Santo, 2016; Tartanac *et al.*, 2019, Cervantes-Zapana *et al.*, 2020). How these effects play out depends on the choices made by policymakers and procurement officers.

National, regional and local governments can tailor PFP initiatives to pursue different outcomes linked to the three dimensions of sustainability (economic, environmental and social). The flexibility to adjust PFP initiatives to specific priorities makes PFP a unique transversal instrument that can be used in very different contexts, ranging from low to high-income economies.

Despite the growing recognition of its potential, PFP still is an underexplored topic. Further research is needed into the linkages between PFP and the broader sustainable development agenda, PFP's multifaceted nature and its multiple potential benefits

[2] In this publication, the term regulatory framework comprises laws and regulations, as well as legal texts of general application, binding judicial decisions and administrative rulings.

and beneficiaries, PFP instruments, enablers and barriers, and the experiences and scaling-up strategies of cities, regions and countries. This analysis calls for a multidisciplinary approach, whereby different actors, with different roles and perspectives, should provide contributions covering various areas of knowledge.

The core objective of this book is to provide such analysis. The introduction presents key concepts and provides a background on the debate on PFP as a game changer to promote more sustainable food systems and healthy diets. This information helps the reader navigate the 2 volumes and the four main parts of the publication:

- **Volume 1:**
  - **Part A**, which explores the linkages between public procurement and sustainable development;
  - **Part B**, which analyses PFP's multiple benefits and beneficiaries;
- **Volume 2:**
  - **Part C**, which focuses on PFP instruments, enablers and barriers; and
  - **Part D**, which showcases a sample of PFP initiatives from Asia, Africa, Europe and North and South America, as well as from WFP.

2. Food procurement and sustainable development

2.1 Sustainable public procurement

The idea of using public procurement (i.e. the process through which public bodies purchase goods, works and services to fulfill their functions) as a policy instrument to achieve development goals is certainly not new, and does not apply only to the food sector. In the nineteenth century, many countries, including the United States of America, the United Kingdom of Great Britain and Northern Ireland and France, already used public procurement to pursue broader policy goals that contributed to the overall public good of the state (McCrudden, 2004; Quinot, 2013). Examples include the use of public procurement as a tool to enforce anti-discrimination employment laws, promote distributive justice or stimulate entrepreneurial activity by disadvantaged groups, such as small and medium-sized enterprises (SMEs) (McCrudden, 2004, 2007a).

However, this type of practice declined as a consequence of the economic constraints imposed by globalization and the influence of neoliberalism, especially during the 1980s. Indeed, according to the neoliberalist perspective, the role of the state in the economy must be limited, and public services are more efficiently delivered by the private sector or, where this is not possible, by the public sector operating under private market rules (McCrudden, 2007b; Melo Araujo, 2016). In the 1980s, the use of public procurement as a policy instrument to achieve development goals started to be seen as a source of financial inefficiency. New procurement rules were built around these ideologies, placing values like "lowest cost" and "full and open competition" at the heart of procurement systems (De Schutter, 2014; Swensson, 2018).

After decades of minimum interaction between the state and the market, the idea that governments can and should use public procurement to pursue social, environmental or economic goals is gaining traction again. This revival has been shaped by new political and economic ideologies, as well as by the increased importance that sustainable development has acquired in regional and international policy debates. The recognition of the role that public procurement can play in sustainable development by no way implies that public procurement shall distort or hinder the proper functioning of the market. Rather, it means that values other than cost and competition – such as social, economic and environmental values – shall also be taken into consideration (Watermeyer, 2004; Quinot, 2013; Cervantes-Zapana *et al.*, 2020).

The concept of sustainable public procurement (SPP) – the process of integrating a sustainable development perspective into public procurement, whereby economic, environmental and social aspects of development are considered in a holistic manner – has gained wide recognition over the past two decades, at both international and national levels.[3] It is important to highlight that SPP covers, but goes beyond, the

[3] There are various definitions of sustainable public procurement. Although slightly different, they all share the idea that social, economic and environmental considerations must be taken into consideration in a holistic way. For instance, the Marrakech Process on Sustainable Consumption and Production defines SPP as:

- the process whereby public organizations meet their needs for goods, services, works and utilities in a way that achieves value for money on a whole life-cycle basis in terms of generating benefits not only to the organization, but also to society and the economy, whilst significantly reducing negative impacts on the environment (UNEP, 2017, p. 1).

Similarly, the European Commission defines sustainable public procurement as:

- a process by which public authorities seek to achieve the appropriate balance between the three pillars of sustainable development – economic, social and environmental – when procuring goods, services or works at all stages of the project (European Commission, s.d.).

concept of green public procurement.[4] Indeed, besides the environmental perspective, SPP also takes social and economic perspectives into account.

As discussed in Part A of this publication, SPP is recognized in the United Nations' Sustainable Development Goals (SDGs) as a key strategic component of the global effort towards sustainable consumption and production patterns. The SDGs include a specific target (12.7) that promotes "public procurement practices that are sustainable, in accordance with national policies and priorities." This provides a platform for linking public procurement practices with sustainable development outcomes, as well as for aligning public spending with the development objectives of governments and the wider international community (Hansen, 2020) (see also Chapter 3 of this publication).

In addition, SPP has been recognized as one of the six programmes of the One Planet Network.[5] Under the SPP programme, the various parties involved in this voluntary, global multi-stakeholder partnership (governmental, non-governmental, public and private) work together to promote and accelerate the implementation of SPP across the globe as a way to promote sustainable consumption and production patterns and achieve SDG 12 (One Planet Network, n.d.-a) (see also Chapter 3).

Many international, regional and national legal frameworks for public procurement have been revised to recognize SPP and provide instruments for its implementation (see also Chapter 2). Examples include the revised versions of the United Nations Commission on International Trade Law (UNCITRAL) Model Law on Public Procurement (2011), the World Trade Organization's Agreement on Government Procurement (2012) and the European Union's directives on public procurement (2014). In its *Global Review of Sustainable Public Procurement* of 2017, the United Nations Environment Programme (UNEP) found that SPP is progressively being embraced by both national and local authorities and that it has become a growing trend in each of the studied

[4] Green public procurement is defined by the European Union as:

- a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured (European Union, 2016, p. 5).

[5] The One Planet Network is a multi-stakeholder partnership for sustainable development and an implementation mechanism of SGD 12. It was created with the objective to implement the 10-Year Framework of Programmes on Sustainable Consumption and Production (10YFP), a global commitment adopted in 2012 at the World Summit on Sustainable Development to accelerate the shift towards sustainable consumption and production in both developed and developing countries. The One Planet Network is composed of six programmes: Sustainable Public Procurement, Sustainable Buildings and Construction, Sustainable Tourism, Sustainable Food Systems, Consumer Information, and Sustainable Lifestyles and Education (One Planet Network, n.d.-b).

regions (UNEP, 2017). SPP is receiving renewed attention in the academic literature, too (Watermeyer, 2004; McCrudden, 2004; Thai, 2008; Preuss, 2009; Arrowsmith *et al.*, 2011; Brammer and Walkers, 2011; Quinot, 2013, 2018; Smith *et al.*, 2016).

Key areas of implementation of SPP practices currently include office furniture, computers and monitors, transportation, cleaning products and services, construction, electricity, textiles, food and catering and medical items (UNEP, 2017).

Thus, SPP has reached a turning point: it is recognized as a strategic tool to drive sustainability and transform markets (UNEP, 2017; Quinot, 2013). Indeed, the question is no longer *whether* public procurement (including public food procurement) should be used to pursue social, economic and environmental goals, but rather *how* i.e. how to best use and implement public procurement as a strategic tool to drive sustainability? How can we improve our understanding of the instruments, enablers and barriers that promote or hamper sustainable food procurement? These are some of the questions this book aims to address.

2.2 Sustainable public food procurement

Food procurement is an important component of SPP. Indeed, in many countries, food and catering services are among the main categories prioritized by the government to include sustainability criteria in public procurement activities (UNEP, 2017). The importance of food procurement within SPP is also recognized in various regional frameworks, such as the recent European Green Deal and Farm to Fork Strategy of the European Union. However, in many other countries, the connection between food procurement initiatives and the broader SPP agenda or (where an agenda is not in place) debate is not yet that evident.

The linkage between food procurement initiatives and the broader SPP agenda and debate seems to be clearest in high-income countries (and especially the countries of the European Union), where most research on SPP practices has been conducted (Hansen, 2020).[6] Examples explored in this publication include Denmark, France, Italy

[6] Hansen (2020) provides a systematic review of the literature on SPP constraints. The study suggests that research has predominately focused on SPP practices in high-income countries such as Australia, Canada, Denmark, France, Ireland, Sweden, the United Kingdom of Great Britain and Northern Ireland, the United States of America and the countries of the European Union.

and Scotland, where public food procurement initiatives are anchored into specific SPP policy frameworks (see Chapters 2, 7, 13, 18, 20, 26 and 27). In these countries, SPP has been most commonly associated with environmental concerns, with a more recent and progressive integration of other social and economic concerns (UNEP, 2017) (see also Stoffel *et al.* [2019] for a broader discussion on the integration of the different dimensions of sustainability in SPP in Europe and sub-Saharan Africa).

In low- and middle-income countries, the direct linkage between food procurement initiatives and a broader SPP agenda or debate is not so evident. Most often, such initiatives are neither reported as an implementation of or contribution to SDG target 12.7, nor studied as a significant example of SPP.

This does not mean, however, that public food procurement is not being used as a key instrument to pursue development goals in these countries, too. On the contrary, in these countries in particular, public food procurement has been receiving considerable attention. It is being used as an instrument to pursue development goals, as highlighted by the many case studies from Africa, South America and Asia presented in Part D of this publication.

One key example are home-grown school feeding (HGSF) initiatives, or school feeding programmes designed to provide children in schools with safe, diverse and nutritious food sourced locally from smallholders (FAO and WFP, 2018). The HGSF model is mainly implemented in low- and medium-income countries, where it is used as an instrument to promote the health and well-being of school-aged children, as well as to support local agricultural production and promote the economic inclusion of vulnerable food producers. Chapters 4, 5, 6, 8, 9, 10, 11, 12, 14, 15, 16, 17, 19, 21, 33, 34 and 35 of this publication provide examples of the implementation of the HGSF model in various countries of the world.

Many reasons may explain why PFP initiatives are often disconnected from a broader SPP agenda or debate. One reason is that food procurement programmes are developed in function of specific entry points (such as health, nutrition or agriculture). These entry points are often not the same entry points as those of the broader SPP debate, which may focus, for instance, on the inclusion and support of SMEs, rather than of farmers or farmers' organizations.

Another explaining factor is that PFP programmes, such as school feeding programmes, are mostly designed and implemented by ministries and agencies other than those that are involved in the design of SPP policies. Indeed, the latter are often those working on environmental, economic and financial affairs (UNEP, 2017). Meanwhile, food procurement initiatives, and especially school feeding initiatives, are mostly designed by ministries and agencies working in the fields of education, social protection or agriculture. The lack of multi-stakeholder dialogue and coordination among these different actors is very evident in many countries. It constitutes an important bottleneck for the further development of food procurement initiatives within the SPP agenda and debate.[7]

The data on SPP and sustainable PFP, especially from low-income economies, are still very limited.[8] In its *Global Review of Sustainable Public Procurement* of 2017, the UNEP found that of the 56 national governments that participated in the survey, only one (Côte d'Ivoire) was from Africa (UNEP, 2017). More data and research are needed to gain a better understanding of the two agendas and promote their development and connection. Here, the importance of multidisciplinary research must be stressed. The researchers involved in the analysis of PFP initiatives (and especially of HGSF initiatives) often focus on specific areas of knowledge and use specific entry points. These entry points may not be directly linked to SPP. In addition, public procurement researchers often do not treat food procurement and its peculiarities as a key study area, especially in the Global South. A multisectorial and multidisciplinary approach to PFP is therefore key; it is one of the pillars of this publication.

PFP initiatives, including school feeding programmes, should be recognized as an important part of SPP that may contribute to achieving SDG target 12.7. The possibility to use PFP to pursue very diverse social, economic and environmental

[7] This observation has been one of the main outcomes of the Africa Regional Workshop on Designing and Implementing Sustainable Public Food Procurement for Home Grown School Meals Programmes, organized by FAO and the African Union in 2019. Representatives of public procurement regulatory authorities and ministries of education, agriculture and/or social protection from 16 countries in Africa participated in this workshop.

[8] Important work on these topics include the work of the African Procurement Law Unit, an inter-institutional research unit that promotes research, training and the building of networks for public procurement regulation on the African continent (see **www.africanprocurementlaw.org**). Another important example is the work done by the Deutsches Institut für Entwicklugspolitik (German Development Institute), for example through its annual International Dialogue Forum on Sustainable Public Procurement. This forum provides a platform for debates between decision makers, procurement practitioners, researchers and members of the civil society from Europe, Latin America and sub-Saharan Africa.

objectives demonstrates the flexibility and adaptability of this instrument. Indeed, PFP initiatives can be tailored to different contexts at national, regional and local levels. The recognition of PFP initiatives as an important part of SPP is key to reinforce both agendas at local, national and international levels, promote a systems-based approach and support the development of proper regulatory and policy instruments for effective implementation. To achieve these goals, the promotion of multisectorial coordination, the creation of knowledge exchange platforms at multiple levels and the development of multidisciplinary studies are crucial.

3. Public food procurement, sustainable food systems and healthy diets

3.1 Public food procurement as an entry point for food system transformation

PFP is increasingly being recognized as a strategic entry point for advancing sustainable food systems and healthy diets. This brings two important values to the SPP debate: health and nutrition (Morgan and Sonnino, 2008; De Schutter, 2014; Global Panel on Agriculture and Food Systems for Nutrition, 2015; Hawkes, 2015; Fitch and Santos, 2016; Swensson and Tartanac, 2020; Steiner, 2021; Carducci *et al.*, 2021).

Malnutrition in all its forms (such as hunger, stunting, wasting, micronutrient deficiencies, overweight and/or obesity) is a problem of global proportions. It affects one in three individuals worldwide, with an estimated cost to society of around USD 3.5 trillion per year (FAO and WHO, 2019; Global Panel on Agriculture and Food Systems for Nutrition, 2016). The nutritional status of the most vulnerable population groups is expected to deteriorate as a result of the health and socio-economic impacts of Covid-19 (FAO *et al.*, 2020).

To address all forms of malnutrition in a comprehensive manner, people need nourishment from healthy diets (FAO *et al.*, 2020; Carducci *et al.*, 2021). A healthy diet consists of a balanced, diverse and appropriate selection of foods eaten over a period of time. It meets the needs for macronutrients (proteins, fats and carbohydrates, including dietary fibre) and essential micronutrients (vitamins, minerals and trace

elements) specific to a person's gender, age, physical activity level and physiological state (WHO, 2018). Healthy diets protect against malnutrition in all its forms, including diet-related non-communicable diseases (NCDs).

Not all healthy diets are sustainable, and not all diets designed for sustainability are healthy (FAO *et al.*, 2020). Indeed, diets can have an important impact on environmental sustainability. As highlighted by the EAT-Lancet Commission, strong evidence indicates that food production is among the most important drivers of environmental change globally. It contributes to climate change, biodiversity loss, excessive freshwater use, the disruption of global nitrogen and phosphorus cycles and land-system change (Willet *et al.*, 2019).[9]

Diets may have not only environmental, but also important social and economic impacts and unintended costs. Choices related to food production and consumption may have, for instance, important implications in terms of gender equality or promote certain types – and sizes – of farms and farming systems. It is therefore important that diets are considered from a perspective of sustainability. Within this context, FAO and the WHO recently joined forces to introduce a new concept of sustainable, healthy diets, incorporating all three dimensions of sustainability.[10]

Improving diets is not a simple process. It is increasingly recognized internationally that in order to improve diets, the entire food system must be considered, including all actors (and institutions) involved in the production, aggregation, processing, packaging, distribution, marketing, consumption and disposal of food products (FAO and WHO, 2019; FAO *et al.*, 2020; Haddad *et al.*, 2016; Global Panel on Agriculture and Food Systems for Nutrition, 2016). This has also been recognized by the UN Decade of Action on Nutrition 2016–2025, as well as in the run-up to the UN Food Systems Summit that will take place in July 2021. This summit focuses specifically

[9] The EAT-Lancet Commission consists of 37 leading scientists from various scientific disciplines, from 16 different countries. It seeks to reach scientific consensus on targets for healthy diets and sustainable food production.

[10] FAO and WHO define sustainable healthy diets as: the dietary patterns that promote all dimensions of individuals' health and wellbeing; have low environmental pressure and impact; are accessible, affordable, safe and equitable; and are culturally acceptable. The aims of sustainable healthy diets are to achieve optimal growth and development of all individuals and support functioning and physical, mental, and social wellbeing at all life stages for present and future generations; contribute to preventing all forms of malnutrition (i.e. undernutrition, micronutrient deficiency, overweight and obesity); reduce the risk of diet-related NCDs; and support the preservation of biodiversity and planetary health. Sustainable healthy diets must combine all the dimensions of sustainability to avoid unintended consequences (FAO and WHO, 2019, p. 9).

on the transformation of food systems to promote healthy diets based on food that is produced sustainably, taking into account the various social, economic and environmental impacts of food and food systems.

PFP is one of the instruments that can be used as an entry point to promote a transformative change of food systems towards sustainability. As highlighted in Chapter 1 of this publication, by its very nature PFP affects all different components of the food system (i.e. food production and supply chains, food environments and food consumption). Considering the extent of the demand for food from the public sector, PFP initiatives have the potential to profoundly influence both food consumption and food production patterns and to deliver multiple social, economic and environmental benefits to the food system that can contribute to more sustainable healthy diets. How these effects play out depends on how public procurement choices are made (Swensson and Tartanac, 2020).

In particular, PFP can be used to send signals about governments' ambitions for the future direction of food systems. Such signals have the power to incentivize supply chain actors, including public purchasers, to align practices with values and thus foster a transition towards sustainable food production and consumption (Tartanac *et al.*, 2019). How public food procurement can promote food system transformation is discussed in various chapters of this book (see in particular Chapters 1, 8, 11, 18, 22, 24 and 26).

The homogenization and simplification of our food system is driving the global dietary health crisis. Globally, one in five deaths is associated with poor diets. Food systems are dominated by relatively few staple foods, and the underconsumption of fruits, vegetables, nuts, seeds and pulses is nearly universal. The industrialization of agriculture and the consolidation of global value chains have driven this uniformity, creating major lock-ins and bottlenecks that prevent the production and consumption of more diversified, nutritious foods (IPES-Food, 2016).

Transformative PFP is crucial to address the challenge of food system uniformity: it promotes the procurement of local food and makes it easier for smallholder producers, SMEs, cooperatives and other value chain actors to produce and utilize more diverse fruits, vegetables, grains, nuts and legumes (much of which are currently considered underutilized or neglected crops). A number of the chapters in this book

(for example, Chapters 11, 12, 18, 29, 31 and 33) highlight a number of ways to do this: by creating a structured demand for diversified food products from biodiversity-rich production practices, by creating policy incentives to encourage the production and consumption of underutilized nutrient-rich foods, or by using food-based dietary guidelines in innovative ways and developing novel approaches to change consumer behavior and enhance the desirability of underutilized nutrient-rich foods. While such actions are necessary to address poor diets and nutrition, they are also important in driving positive upstream outcomes, such as biodiversity conservation and environmental sustainability. Valencia, Wittman and Blesh (2019) report that two key features of the National School Feeding Programme (PNAE) in Brazil – the structured demand for diversified food products, and the price premium for certified organic and agroecological production – increase farm-level agrobiodiversity and stimulate the use of agroecological practices (see also Chapter 11). The first of its kind, the study concludes that PNAE plays a key role in driving the transition of family farms from low agrobiodiversity, input-intensive farming systems to diversified farming systems. The authors argue that the programme has thus led to a significant increase in the area cropped under diversified farming systems.

The important role that PFP can play in triggering more sustainable food systems has been recognized by several international frameworks,[11] as well as in the run-up to the UN Food Systems Summit of July 2021. Indeed, during the preparation of this summit, it has been acknowledged that PFP can play a key role to improving the availability and affordability of the diverse and often perishable nutritious foods found in small-scale production systems. These systems are essential to crop biodiversity and account for a significant part of the micronutrients in the global food supply.

It is important to ensure that, in the aftermath of the UN Food Systems Summit, all relevant actions recognized by the Summit – including the improvement of policy and regulatory frameworks, the reduction of the costs and risks faced by SMEs and smallholder producers of nutritious foods, the development of appropriate supply chain infrastructure and nature-positive solutions that seek to increase

[11] These platforms include, for example, the United Nations System Standing Committee on Nutrition, the High Level Panel of Experts on Food Security and Nutrition, the Global Panel on Agriculture and Food Systems for Nutrition, the EAT-Lancet Commission on Healthy Diets from Sustainable Food Systems, the African Union's Comprehensive Africa Agriculture Development Programme and the European Union's Farm to Fork Strategy and Green Deal plan.

agrobiodiversity for diverse production and resilience – are linked to PFP. This is crucial to ensure not only that PFP realizes its transformative power to boost the availability and affordability of nutritious foods and healthier diets, but also to reap the other, multiple social, economic and environmental benefits of sustainable PFP.

3.2 Public food procurement and the three dimensions of sustainability

One key characteristic of public procurement is its potential to contribute to all three dimensions of sustainability (social, economic and environmental). PFP can bring about benefits not only for those who consume food but also for those who produce food, as well as for their communities. By making choices as to what food to purchase, from whom and from what type of production practices, governments can tailor PFP to various policy goals, according to their own contexts and priorities. This makes PFP a potentially powerful instrument that can deliver multiple benefits and reach a multiplicity of beneficiaries, and is adaptable to multiple national, regional and local contexts.

Part B of this publication provides examples of the multiple dividends that PFP may produce and analyses how PFP can contribute to the social, economic and environmental pillars of sustainability.

It analyses the potential of PFP to stimulate agricultural productivity by creating markets that are accessible to smallholder farmers (Chapter 4), make food networks more resilient, sustainable and nutrition-sensitive (Chapter 5), improve children's nutrient intake while improving the livelihoods of their communities (Chapters 6 and 7) and empower rural producers (Chapter 8). Part B also explores the use of PFP as an instrument and opportunity for governments to target and support specific groups of vulnerable rural producers, such as women (Chapter 9) and indigenous people (Chapter 10).

These chapters provide further proof of the potential of PFP to benefit those who receive food, those who produce food and their broader communities by linking agriculture, nutrition and health.

Part B of this publication also explores how PFP, as a demand-driven intervention, can contribute to environmental sustainability. Chapter 11 demonstrates the potential of PFP to drive on-farm crop diversification and promote the adoption of agroecological practices, including organic approaches (see also Chapter 18). Chapter 12 analyses the use of PFP as an entry point to promote biodiversity conservation by stimulating the use of underutilized, nutrient-rich foods (see also Chapters 29, 31 and 33). Chapter 13 explores how PFP can have a significant impact in terms of carbon footprints.

Part D complements this analysis with additional case studies from the United States of America (Chapter 23), Canada (Chapter 24), Northern England and North Wales (Chapter 25), France (Chapter 26), Italy (Chapter 27), Colombia (Chapter 28), Guatemala (Chapter 29), Cambodia (Chapter 30), India (Chapter 31), China (Chapter 32), Kenya (Chapter 33), Ghana (Chapter 34) and Zambia (Chapter 35), as well as from the WFP (Chapter 22).

While PFP may produce multiple benefits for a wide range of beneficiaries, individual PFP initiatives may not achieve all these goals simultaneously. National, regional and local governments will choose to focus on one or several policy goals, according to their contexts, needs and priorities. However, even if they focus on only a few goals, PFP initiatives must be conceived within a multifunctional perspective. This will foster synergies and ensure that the initiatives are implemented in a coordinated manner and according to a multisectoral approach. A multifunctional perspective is also key to addressing the trade-offs between PFP's multiple options and possibilities (see Chapter 35).

While Part B of this publication addresses the multiple benefits and beneficiaries of PFP, Part C focuses on the instruments, enablers and barriers that need to be considered to achieve and reach them.

4. Towards successful implementation: instruments, enablers and barriers for public food procurement

The multifaceted nature of PFP provides a possibility for governments to achieve multiple benefits for different beneficiaries while promoting transformative changes to food systems. However, it also gives rise to multiple difficulties and complexity in its implementation.

The implementation of PFP initiatives is certainly not a simple or straightforward task. As illustrated by the country experiences analysed in this book, the successful implementation of PFP initiatives requires coordinated interventions on both the demand and the supply side. It also requires enabling policy, institutional and regulatory environments (see for example Kelly and Swensson, 2017). The impact assessment discussed in Chapter 35 of this publication shows that in spite of their potential, PFP initiatives can even be detrimental for their target beneficiaries (e.g. smallholder producers and schoolchildren) if not accompanied by adequate support measures. Chapters 21 and 35 demonstrate the importance of rigorous assessments of PFP programmes to determine the impact of PFP across multiple benefits and beneficiaries and to support more evidence-based policy development. However, such assessments are not easy to carry out due to the multifaceted nature of PFP.

Part C of this book analyses key instruments, enablers and barriers for the implementation of PFP initiatives at the levels of demand, supply and policy, institutional and regulatory frameworks. Part D complements this analysis with additional case studies.

Drawing heavily on the experiences of the Brazilian PNAE and Public Purchase Programme (PAA) (which are among the oldest and largest national PFP initiatives in the world), Part C of this book analyses the key factors that may impact the implementation of PFP initiatives by municipalities (Chapter 14), the challenges, dynamics and results of PFP initiatives in Brazil (Chapter 16), and the role played by civil society in Brazil in the construction of an appropriate regulatory framework and implementation mechanism for inclusive PFP (Chapter 15).

Chapter 17 in Part C analyses the challenges facing PFP initiatives and the institutional innovations that have been developed recently in Latin America and the Caribbean to tackle them. Chapter 18 analyses the mix of policy instruments that has been used to promote the inclusion of organic foods in the public plate in Denmark. Chapter 19 discusses the challenges for the implementation and scaling up of PFP initiatives created by public procurement rules and practices, and illustrates how they were addressed in Ethiopia. Chapter 20 analyses the role played by municipalities in various countries, focusing on the definition of tender criteria and the selection of operating modalities. Chapter 21 discusses the methodological challenges of measuring the impacts of PFP and proposes a stepwise methodology to conduct rigorous impact evaluations of HGSF initiatives, with a focus on agricultural development.

The analysis presented in this publication demonstrates that the resolution of many of the challenges related to the implementation of PFP initiatives depends on actions by the state, and especially the development of appropriate regulatory frameworks and policy instruments. Indeed, the analysis confirms that appropriate regulatory frameworks are key to the successful development and implementation of PFP initiatives. However, the analysis in this book also confirms that regulatory frameworks are not sufficient. Other actions by the state are necessary and may involve the use of a complementary mix of policy instruments. These include labelling and certification instruments, monitoring systems, and training and capacity building (see Chapter 18). The state may also provide technical assistance to farmers, set up of registries of family farmers (or other target beneficiaries), decentralize PFP efforts, develop nutrition cards or food-based dietary guidelines aimed at matching the local food supply to beneficiaries' nutritional needs, or formulate appropriate protocols to guarantee food safety and quality (Chapter 17).

However, the analysis in this book also confirms that instruments used by the state alone are not sufficient to ensure the successful formulation and implementation of PFP initiatives. The chapters in Part c of this publication nearly unanimously argue that many other actors, including the private sector, civil society and other stakeholders, have a crucial role to play, too.

Indeed, the fact that PFP is a public policy instrument does not mean that its formulation and implementation must be handled exclusively by the state through

directed and highly controlled policies. Chapter 15 of this book demonstrates that civil society plays a key role in the construction of the regulatory frameworks and implementation mechanisms for inclusive public food procurement. Meanwhile, Chapter 14 shows that social mediators and political entrepreneurs who support the organization and structural strengthening of family farming and are open to dialogue with school managers and nutrition personnel may have a larger impact upon the implementation of PFP programmes than the size of municipalities. Chapter 16 demonstrates that social actors can help overcome many of the difficulties of PFP implementation. Chapter 18 argues that the development and implementation of PFP policies is a complex process that should involve a multitude of different stakeholders at different levels, including commercial and private actors.

The analysis of PFP experiences in this book not only illustrates the role of different actors in PFP implementation, but also highlights the importance of the balance between the role of the state and that of markets. Indeed, where this balance is achieved, the benefits of PFP for society are greater – a highly relevant finding in a period in which pro-market narratives still tend to deny the necessary, proactive role played by the public sector.

PFP should not be seen as an intervention by the state in a domain in which the market should be the only key performer. Rather, it should be seen as an instrument to promote creativity and innovation on the part of private actors in their relationships with the state. Here, instruments such as local governance, social participation and evidence-based policies have a key role to play. They can foster efficient relations between market players and policymakers and help ensure that PFP initiatives reap their full potential.

Although this book was mostly developed prior to the Covid-19 pandemic, its theme is highly relevant in the Covid-19 era. The pandemic has been affecting many of the world's food value chains, with negative effects on both food producers (in particular small and medium farmers) and food consumers, especially the poorest and most vulnerable ones (Torero Cullen, 2020; World Bank, 2021). Quarantine measures and restrictions on the movement of people have limited many farmers' access to inputs and labour, and prevented them from planting or harvesting on time. This has caused food shortages and price hikes, and resulted in considerable economic losses for

farmers (FAO, 2020a; Farmer Income Lab, 2021). In addition, the disruption of public services (e.g. in-field pest monitoring and surveillance) has hampered the adoption of sustainable production practices, with negative effects in terms of environmental sustainability (FAO, 2020b). Moreover, food systems have been affected by the closure of distribution channels and the reduction in the demand for food, including in that from the public sector (WFP, FAO and United Nations Children's Fund [UNICEF], 2020). The closure or reduced functioning of schools has left nearly 1.5 billion children (more than half of the world's school population) out of school, with important negative consequences for child nutrition and educational outcomes, as well as for local food producers involved in HGSF initiatives (WFP, FAO and UNICEF, 2020).

Within this context, PFP has, now more than ever, an important role to play. By localizing sourcing and strengthening the social and inclusiveness aspects of PFP for emergency food assistance and social protection programmes (such as school feeding programmes), governments can use PFP as an important tool to support recovery during and after crises (One Planet Network, 2021). In addition, and as illustrated by various case studies in this publication, sustainable PFP can be used to set an example and build the right track towards more sustainable and resilient local food systems (One Planet Network, 2021; Farmer Income Lab, 2021). More sustainable and resilient local food systems help communities better prepare for, and cope with, shocks, whether recurrent, protracted or unexpected (Eldridge, 2020). Although this publication does not deal explicitly with the Covid-19 pandemic, it does provide many insights that are valuable in the Covid-19 era.

5. Concluding remarks

This introductory chapter has presented a number of key concepts and provided an overview of background discussions to support readers in their journey through this publication. It is built on the recognition that the debate on SPP and PFP should no longer focus on the question of *whether* governments should use public procurement – including food procurement – to pursue social, economic and environmental goals. Rather, the question that researchers, practitioners and policy makers should ask is *how:* how to best use public procurement as a strategic tool to improve sustainability and trigger the transformation of food systems. How to maximize benefits and reach

most beneficiaries? How to improve our understanding of the instruments, enablers and barriers that promote or hold back sustainable food procurement? How to achieve a balance between the role of the state and that of private actors?

This publication aims to provide answers to these questions. By analysing the connections between food procurement and sustainable development and by exploring the multiple potential benefits and beneficiaries of PFP, its instruments, enablers and barriers, and experiences from five continents, the book contributes to the improved understanding of PFP and promotes its wider use as a development tool. This introductory chapter has provided a first step in that direction. Enjoy the rest of the book!

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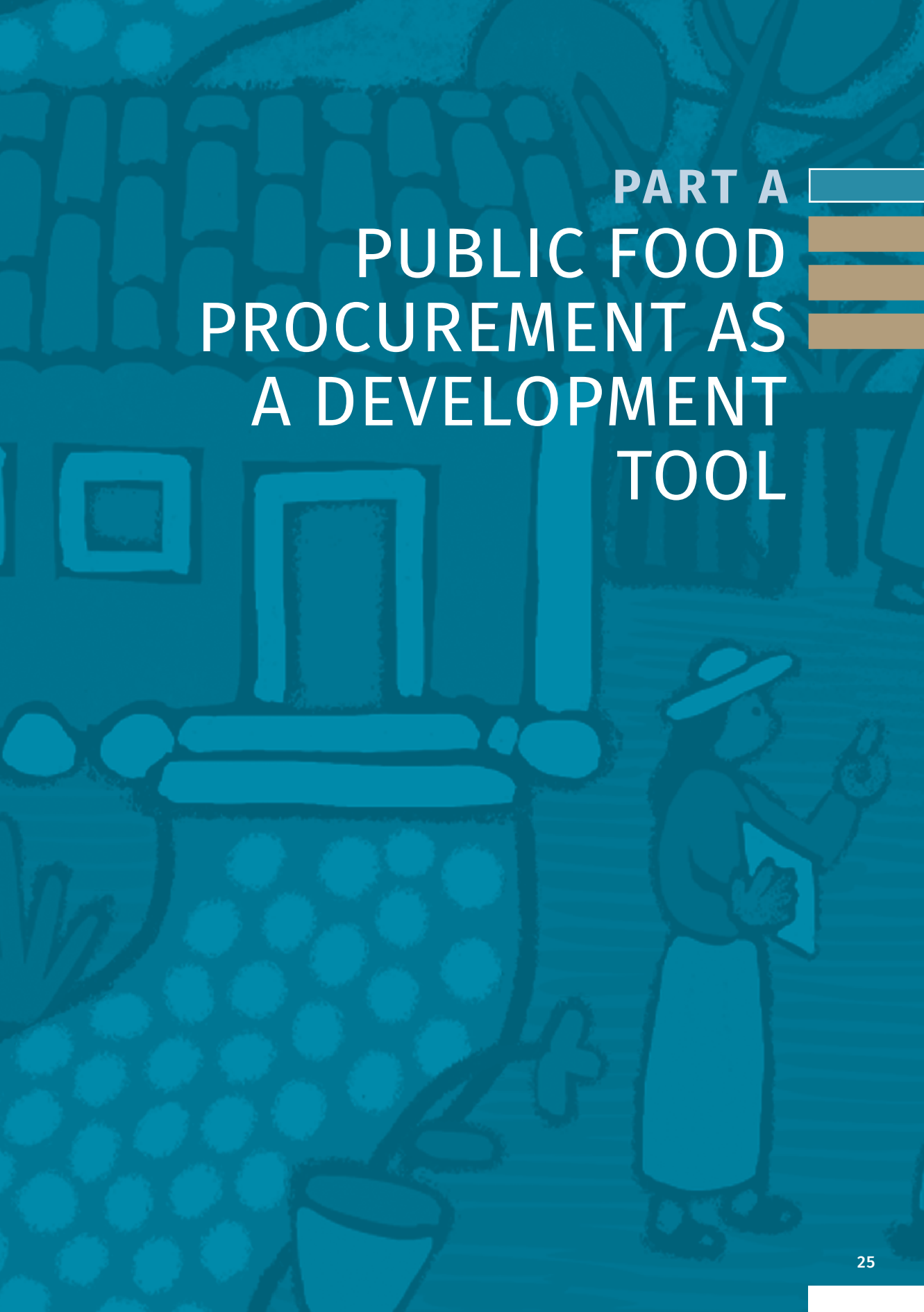

PART A
PUBLIC FOOD PROCUREMENT AS A DEVELOPMENT TOOL

1 PUBLIC PROCUREMENT AS A SUSTAINABLE FOOD AND NUTRITION SECURITY STRATEGY

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ABSTRACT

Widespread calls for development strategies that pursue both human and environmental goals have drawn attention to policy instruments that have the potential to engender systemic food change. Among these instruments, public food procurement has emerged as an especially promising tool to promote sustainable and secure food systems. This chapter reviews the scientific and grey literature on the contribution of public food procurement to food and nutrition security, and analyses two cases of school food reforms (in Ghana and Scotland). It explores the relationship between procurement policies, food and nutrition security and sustainable development. The analysis identifies a range of factors that may affect the sustainability of public food procurement, pointing to the need to construct enabling and inclusive governance arrangements at different levels.

1.1 Introduction

Over the past decades, the development potential of public procurement – the process through which public bodies purchase goods and services – has been extolled in policy and academic debates. A prime example is the identification of sustainable procurement practices as a key target to achieve Sustainable Development Goal (SDG) 12: "Ensure sustainable production and consumption patterns" (United Nations, 2015). Similarly, the Food and Agriculture Organization of the United Nations (FAO) has recently identified inclusive public procurement as a "comprehensive area of

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support" for the delivery of its innovative "Framework for the Urban Food Agenda" (FAO, 2019). The assumption underlying this global policy discourse is that by purchasing environmentally and socially preferable goods and services, governments may significantly contribute towards the development of a sustainable economy (United Nations Environment Programme [UNEP], 2012; Green Growth Knowledge Platform, 2013; Organisation for Economic Co-operation and Development [OECD], 2014; European Commission, 2015).

The academic literature on the sustainability potential of public purchasing strategies has mostly focused on food. Using empirically-rich descriptions of innovative strategies, researchers have identified public procurement as a policy tool that can be used to address the challenges of an unsustainable food system (Morgan and Sonnino, 2010; Lehtinen, 2012; Morgan and Morley, 2014; Sonnino, 2019). To date, however, there has been no explicit discussion of the relationship between public procurement and food and nutrition security, defined by FAO as:

> *the condition that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2002).*

To help fill this gap, this chapter analyses data collected during a systematic review of the literature. A search for relevant literature based on the use of the keywords "public procurement" and "food" (restricted to the titles of articles, abstracts and keywords) yielded 63 academic articles. Their review was complemented with the analysis of a vast body of grey literature, identified through a Google search (again using "food" and "public procurement" as keywords) or cited in the selected academic articles. All this material was analysed to identify the main features of public food systems as contributors to food and nutrition security, their relationships with the broader food system in which they are nested, and the vulnerabilities that may affect the capacity of a public food system to deliver food and nutrition security outcomes. Insights from this meta-analysis are used to briefly examine the main features of two school food reforms (one in the Global North and the other in the Global South). This analysis raises important questions about the importance of the context of governance in the creation and maintenance of a strong relationship between public procurement policies and food and nutrition security objectives.

1.2 Public procurement as a tool for food system transformation

Public food procurement impacts upon the different components of food systems and affects a wide range of actors, assets and outcomes. At the level of production, key activities that may be affected by public procurement are agricultural planning and development. Suppliers may need to adjust their production strategies to comply with the specifications of contracts. For example, they may have to manufacture new types of food for public meals that meet local tastes and nutritional needs or step up organic production or sourcing (Morgan and Sonnino, 2013). An example of the power of public procurement as a driver of agricultural development (in this case, organic agriculture) is found in Sweden. In 2006, the Swedish Government introduced a law that required the public sector to increase its organic food purchasing to 25 percent of the total. This requirement led to a 20 percent increase in the mean share of organic farmland in overall farmland, from 6.9 percent in 2003 to 19.8 percent in 2016; absolute levels followed a similar trend, with the total number of hectares under organic cultivation increasing from 10 800 ha in 2003 to 26 300 ha in 2016 (Lindstrom, Lundberg and Marklund, 2020).

Food distribution is an important element in the implementation of public procurement initiatives, especially when the procurement cannot rely solely on local supplies (as is often the case in the Global North) or when transportation costs and arrangements exclude small farmers from institutional markets. The latter problem has been identified as one of the main barriers to the use of public procurement as an effective strategy for food and nutrition security in the Global South (Kelly and Swensson, 2017). In industrialized countries, local authorities – ranging from the small county of South Gloucestershire, in England, to the city of New York – have attempted to overcome distribution challenges by focusing their tendering processes on food distributors, rather than producers (Morgan and Sonnino, 2013). A similar strategy has been used in Kenya, where the transportation of food from World Food Programme (WFP) warehouses to beneficiary destinations is organized through long-term contracts with commercial transport companies (Kelly and Swensson, 2017).

The large-scale distribution of food is invariably affected by international trade. In some cases, public procurement requirements can trigger a virtuous development

cycle. This is the case, for example, for the city of Rome, which used to source fair trade-certified products (bananas, tea, coffee and chocolate bars) for its large school food system (27 million meals per year). As a result of this initiative, Italy recorded a 20 percent increase in annual sales of fair trade products between 2004 and 2006 (Sonnino, 2009). In many developing countries, however, international trade rules constrain governments' capacity to connect public procurement policies with strategies for food and nutrition security. In Indonesia, for example, administered prices, supported by public procurement, have historically been largely successful at providing price stability for both farmers and consumers, and hence at supporting livelihoods and enhancing food and nutrition security. Outcomes of deliberations at the World Trade Organization (WTO) since 2013, however, have reduced the policy space to administer prices for agricultural commodities, leading to a worrying decline in farmers' income (as experienced, for example, in China and India) (Thow, Sharma and Rachmi, 2019).

As far as the demand side is concerned, public procurement touches upon all aspects of food consumption. Schools, hospitals, prisons and care homes serve millions of meals every day, engaging in activities that range from menu planning, which is usually determined by existing nutritional standards and dietary requirements, to the acquisition and storage of ingredients and the preparation of meals. These meals are often the main, if not only, meal of the day for vulnerable citizens. Children in schools, patients in hospitals and the elderly in care homes obtain important nutrients in public canteens, which in some cases also offer a good opportunity for food education (Lagasse and Neff, 2010; Morgan and Sonnino, 2010).

There are critical waste issues associated with public procurement. Throughout the Global North, the loss of skills and infrastructure for healthy cooking (e.g. on-site kitchens), the difficulty of planning an exact number of meals on a daily basis (especially in hospitals), the use of pre-prepared and packaged meals that must be reheated in bulk, portion sizes that are too large (see Balzaretti *et al.*, 2020) and the lack of training of kitchen and catering personnel all result in often very high levels of food waste in public procurement. In some British hospitals, for example, up to 60 percent of the food purchased is wasted (Sonnino and McWilliam, 2011). To address this problem, the city of Rome allocated the responsibility for waste management to the school catering companies, introduced recycling schemes and requested caterers

to distribute uneaten food to food banks and leftovers to animal shelters in the city (Sonnino, 2009). As shown by recent studies, other municipal authorities (particularly in Europe) are beginning to exploit the opportunities offered by public procurement to support the transition towards more circular food economies (Alhola *et al.*, 2019). In some cases, this transition corresponds with increasing calls for strategies to exploit the potential of public procurement to promote food democracy (Mazzocchi and Marino, 2019), food sovereignty (Villalba and Perez de Mendiguren, 2019) and regional self-sufficiency (Orlando *et al.*, 2019).

As argued by Kelly and Swensson (2017), in developing countries many of these issues can be addressed through the formulation of national policies that place small farmers and entrepreneurs at the centre of agricultural transformation (as happened, for example, in Brazil and Rwanda). The creation of robust information and communications technology (ICT) infrastructure (combined with efforts to enhance human capacities to use it) is essential to communicate public procurement requirements to food producers, assess market readiness and increase the effectiveness of monitoring and evaluation systems for public food markets (Adjei-Bamfo, Maloreh-Nyamekye and Ahenkan, 2019).

More broadly, public procurement has the potential to contribute to the different dimensions of sustainability, from socio-economic welfare to environmental security. Evidence suggests that improving the nutritional quality and dining environments of school food may not only help tackle the different dimensions of food and nutrition security, but may also result in improved academic performance, engagement and classroom concentration (Storey *et al.*, 2010). Likewise, hospitals have the potential to communicate their primary prevention messages through the food they provide and thus become "a vehicle of improvement and a role model for food in the local community" (United Kingdom, Department of Health, 2014, p. 5).

An example of how public procurement can contribute to the environmental objectives of sustainability is provided by the city of Turin (Italy), where the introduction of vegetarian school meals has led to a reduction in the overall carbon footprint of school feeding by 32 percent (Cerutti *et al.*, 2018). In the United States of America, the Balanced Menus programme, developed by the San Francisco Bay Area chapter of Physicians for Social Responsibility, promotes human and environmental health by

changing menus in hospitals. Four hospitals participate in this programme to improve the nutritiousness and sustainability of their meals. Under the programme, meat consumption is reduced by 28 percent to curb greenhouse gas emissions and carbon footprints, as well as reduce costs. It is estimated that the programme prevented 1 004 tonnes of CO_2 emissions and allowed the hospitals to cut food spending by USD 400 512 (Lagasse and Neff, 2010; Health Care Without Harm, 2016). In the United Kingdom, the Nottingham University Hospitals NHS Trust places a strong emphasis on local food in its catering, with 77 percent of the ingredients being sourced locally. The Trust has reduced food waste by avoiding over-ordering and implementing a new "smart" meal ordering system. The meals provided cater to patients' nutritional and cultural requirements (e.g. by offering vegan and halal options); they contain less sugar, salt and fats and include at least five portions of fruits and vegetables a day. The Trust has stated that their local procurement strategy helps save 150 000 food miles and GBP 6 million a year (Nottingham University Hospitals NHS Trust, 2014; Nottingham City Council, 2015).

In sum, from a social perspective, public food procurement systems can create or enhance access to nutritious food for vulnerable citizens (schoolchildren, the elderly or the sick); economically speaking, they can generate employment across the food system; from an environmental point of view, they can provide an incentive to maintain or even enhance existing ecosystem stocks, flows and services. Due to these characteristics, public food procurement is a prime instrument to respond to the persistent calls for a systemic approach to food and nutrition security and overcome the enduring divide between supply-focused and demand-focused interventions (see Sonnino, Marsden and Moragues-Faus, 2016). The various chapters of this publication present additional research and country experiences that reinforce these affirmations.

1.3 Public procurement as a food and nutrition security strategy

As a policy tool, public procurement has a specific contribution to make to food and nutrition security, for three main reasons. First, unlike most other policies, public procurement has a bearing on all the main pillars of food and nutrition security. Indeed, measures that governments implement to enhance *access* to healthy and nutritious food (e.g. in public canteens) often entail complementary market-based

interventions to increase the *availability* of healthy, nutritious and safe food products, i.e. to improve their *utilization* potential. The length of public procurement contracts and the presence of monitoring systems often contribute to the *stability* of food and nutrition security outcomes in public canteens over time. Second, unlike other food policies, which often focus on either food supply (e.g. direct subsidies to farmers) or food demand (e.g. food labelling and measures to reduce the fat, sugar and salt contents of food products), public procurement policies affect the entire food chain. Indeed, in order to be effective, they must balance the demand and the supply of healthy and nutritious food. Finally, public procurement focuses on vulnerable social groups that are often at a high risk of food insecurity and targets such groups collectively, as citizens, rather than as individual consumers. As such, public food procurement radically differs from anti-hunger strategies (such as food assistance through the operation of food banks) that intervene at the micro-level, framing food and nutrition insecurity narrowly as the outcome of a lack of individual purchasing power – what Jarosz (2011) calls "the individualization of hunger."

While there is considerable potential to incorporate the principles of sustainability, human health and wellbeing in public food procurement, the literature suggests that a range of barriers prevent this potential from being realized in practice. Research has shown that food and nutrition security outcomes can be embedded in public food procurement systems by carefully balancing different sustainability objectives (Otsuki, 2011); however, sustaining such systems over space and time is a difficult process that involves a range of factors (Sonnino, Lozano Torres and Schneider, 2014; Walker and Brammer, 2009), including:

- **Information**, or the ability of the actors and organizations involved in a public food procurement system (e.g. procurement managers, suppliers, caterers, food service staff, etc.) to understand and value the potential for food and nutrition security of public procurement. As argued by Smith *et al.* (2016, p. 252), "strong leadership at political, administrative, cultural and commercial levels, along with clear goals, adequate resourcing and cross-departmental commitment and cooperation" are vital to ensure that public food procurement policies effectively deliver food and nutrition security.
- **Perceptions** of the financial viability of sustainable procurement policies focusing on food and nutrition security; such perceptions are shaped primarily by actors'

understanding of the difference between the internalized and the externalized costs of public food services. Critics argue that one of the biggest obstacles to the design and implementation of public food procurement systems for food and nutrition security, especially in industrialized countries, is the primacy of a rigid "value for money" ethos, which hinders the formulation of creative and flexible solutions and reinforces a risk-averse culture that inhibits change (Morgan and Sonnino, 2013). The widespread perceptions that sustainable food options drive up costs and that "value for money" is not consistent with sustainability have further entrenched a narrow efficiency culture within the public sector.

- **Organizational culture**, that is, the presence or absence of incentives to embed food and nutrition security goals in the design of tenders. Existing research emphasizes the role played by the "metric" (i.e. the set and balance of criteria) used to score tenders and award public contracts (Lang, 2010) and by the system used to monitor the quality of public food services (Uyarra and Flanagan, 2010). In developing countries, problems of corruption, international trade rules that favour imports over local (fresh) foods and weak governance often preclude the strategic use of public food procurement as a lever for food and nutrition security.
- **Technological capacity and capabilities**, or the existence of the physical infrastructure that is necessary to reduce postharvest losses (especially high in developing countries) (Kelly and Swensson, 2017) and, more generally, to improve the fundamental principles and routines embedded in food provision services (Sonnino and McWilliam, 2011).

It is important to emphasize that food and nutrition security outcomes may also be affected by the interactions between these factors. The allocation of an adequate budget to support public food systems that deliver food and nutrition security depends on the type of organizational culture, knowledge and skills in a specific location. This is especially evident in relation to school food programmes, which have only received appropriate financial support in countries such as Italy and Brazil, where school meal systems are perceived as instruments to promote education and health (rather than as a commercial service) (Morgan and Sonnino, 2013; Sonnino *et al.*, 2014) (see also Chapters 2, 8, 9, 10, 11, 12, 14, 15 and 16 on the Brazilian experience). The creation and upholding over time of such a vision depends not only on political will and leadership but also on the presence of enabling and inclusive governance frameworks that empower citizens by educating them about food and health.

Section 3 and Section 4 analyse two case studies: the home-grown school feeding programme (HGSF) in Ghana, which was launched and coordinated by a global development agency, and school food reform in East Ayrshire, Scotland, which was initiated at the local level (see Chapters 5, 23 and 34 for additional analysis of these experiences). What these two models have in common is an emphasis on the use of public procurement as a strategy to feed vulnerable citizens (in both cases, schoolchildren) and, at the same time, create markets for small-scale food producers – two target groups that are key in strategies for food and nutrition security.

1.4 Public procurement as a tool for food and nutrition security: the examples of Ghana and Scotland

In developing countries, school feeding programmes have long been used to combat persistent problems of hunger and poverty and to act as a safety net in times of crisis. Most initiatives are coordinated by external actors, rather than by national governments. Indeed, the World Food Programme (WFP) is the world's largest provider of school food programmes (Bundy *et al*., 2009). This organization launched the home-grown school feeding model as a development tool linking school feeding to local agricultural production, thus targeting not only schoolchildren but also small-scale farmers – two key vulnerable groups in terms of food and nutrition security.

Ghana was one of the first countries to launch a school feeding programme (the Ghana School Feeding Programme or GSFP) in 2005, with three explicit objectives: to reduce hunger and malnutrition, to increase school enrolment and attendance, and to boost domestic food production. The programme was trialled in ten schools in 2005, and expanded to cover 200 schools and 69 000 students in 2006. By the end of 2010, the programme covered 1 741 schools and 697 416 students (Ghana, 2011).

Due to its early implementation and strong support from the government, GSFP has emerged as an emblem of home-grown school feeding (Sonnino, Spayde and Ashe, 2016). However, GSFP has both strengths and weaknesses. In terms of outreach, the programme was scaled up very rapidly, but the number of children reached in 2010 represented only 22 percent of the total number of pupils and students (Sonnino,

Spayde and Ashe, 2016). In addition, beneficiaries tend to be concentrated in the more prosperous areas of the country as a result of political targeting (de Hauwere, 2008). Anecdotal evidence and case studies suggest that the programme promoted enrolment, improved retention rates in schools (Haverkort, 2008; de Carvalho *et al.*, 2011) and boosted the number of schools with potable water and toilet and sanitation facilities. Other positive outcomes include the provision of health training to 40 percent of school cooks and the introduction of a number of school gardens (Ghana, 2011).

Whether the programme was successful at creating markets for local small farmers is far more questionable. According to the United States Department of Agriculture (USDA) (USDA, 2009, p. v), small farmers in Ghana lack the production capacity to provide food to local schools and require assistance to acquire the inputs necessary to increase production. Moreover, the country faces a shortage of storage and drying facilities. As a result, postharvest losses range from 20 to 50 percent for fruits, vegetables, roots and tubers, and from 20 to 30 percent for cereals and legumes (Sonnino, Spayde and Ashe, 2016).

GSFP stipulates that 80 percent of the budget to buy food should be spent within the community where schools are located. However, caterers in charge of food sourcing are entitled to keep whatever profit they can generate and thus have no incentive to contract with smallholders (whose prices may be higher than those of larger traders) or to help them develop their production capacity (Morgan and Sonnino, 2013).

Thus, while GSFP has at least partially succeeded in reaching one of its target groups (schoolchildren), it has largely failed to reach its other target group (smallholders). To remedy this shortcoming, the regulations governing the programme and its provisions regarding logistics must be improved. For example, targets for local purchasing must be defined and funds must be delivered promptly (Sonnino, Spayde and Ashe, 2016). Indeed, smallholders are unable to extend credit to schools that cannot pay up front; when school caterers do not have the money needed for the day's meals, students simply get less food (see also de Carvalho *et al.*, 2011, pp. 46–47).

Another school food reform characterized by a systemic approach to food and nutrition security is that found in East Ayrshire, Scotland. This council area has higher than average rates of unemployment, reliance on benefits, deaths resulting from heart disease and cancer, teen pregnancies and students eligible for free school

meals (Sonnino, 2010). East Ayrshire's school food reform was the outcome of a joint approach, whereby the local government embraced the role of school food as an important contributor to a full spectrum of objectives: to improve the population's health, to develop the local economy and to fulfil a global mandate of ecological responsibility. To achieve these goals, one of the local government's primary strategies was to emphasize local sourcing and partnering with local producers through the adoption of a creative tendering model for inclusive procurement. Specifically, the local authority loosened some of the strict requirements for straightness for class 1 vegetables (to attract more organic producers), divided the contract into nine smaller lots instead of the four larger ones used previously (to enable smaller producers to participate) and actively encouraged the participation of local producers (Sonnino, 2010).

Importantly, East Ayrshire used contract award criteria that valued price and quality equally. The quality criteria were designed to favour local producers; they included provisions regarding producers' ability to respect deadlines, the time lapse between harvest and delivery, the inclusion of fair-trade, seasonal and traditional products, staff training, animal welfare, the contribution to biodiversity and efforts to minimize packaging and waste (Morgan and Sonnino, 2013). At the same time, the local government intervened on other fronts; it provided training to catering staff and adopted a "whole school" approach that aimed to transform children into more knowledgeable consumers. The "whole school" approach recognizes the "interconnectivity between school food, child nutrition and educational attainment as well as wider public health, social justice and environmental sustainability issues" (Morgan and Morley, 2014, p. 87), and has been acknowledged as an effective approach to improve dietary patterns by the World Health Organization (WHO, 2014).

The measurable results of East Ayrshire's reform confirm that school meals can indeed play an important role in terms of connecting food and nutrition security and sustainability. In just two years, from 2008 to 2010, the number of obese and overweight children in East Ayrshire dropped by 30 and 22 percent, respectively, and the county moved from being Scotland's "fattest" region to its second slimmest. From the perspective of economic development, the reform created opportunities for local suppliers; indeed, the implementation of the programme in the first 12 schools had a multiplier effect on the local economy of GBP 160 000 (Morgan and Sonnino, 2013).

The programme's environmental effectiveness is corroborated by several external assessments. The first, commissioned by the Scottish Environmental Protection Agency in 2007–2008, evaluated one primary school and estimated that 37.7 tonnes of CO_2 emissions were saved annually due to a 70 percent reduction in food miles. A second study, conducted in 2007–2008, aimed to calculate the social return on investment of the programme. It considered environmental, economic, health and other factors (including, among others, food miles, agricultural externalities, increases in local employment and production, and the reduction of the number of overweight children with a high probability of future disease), and estimated a return of GBP 6 for each GBP invested in the programme (Gourlay, 2007).

East Ayrshire's reform was not without challenges. Involving small local producers in the tendering system required targeted communication efforts (evidence shows that, despite these efforts, a number of producers remained unable or unwilling to tender). The short duration of the contracts, producers' limited production and distribution capacities and their lack of experience in public tendering all acted as barriers to inclusiveness (Sonnino, 2010). Moreover, take-up rates (the percentage of children who purchase their lunches in schools) remains a problem. East Ayrshire's programme experienced a total increase in take-up of approximately 4 percent since the beginning of the reform, and customer satisfaction – measured among children and parents who participate in the service – is high. However, persistent efforts are needed to ensure sufficient take-up and thus guarantee the continuity of the service.

1.5 Conclusions

A systematic review of the literature shows that public food procurement has the potential to promote food system resilience and adaptive change. Public food procurement can improve food and nutrition security by enhancing access to healthy food for vulnerable groups, as well as by promoting wider long-term changes in the food chain (e.g. changes in agricultural practices or the creation of markets for small-scale producers who are often marginalized by the forces of globalization). Furthermore, evidence shows that the "public plate" can be actively used as an instrument to enhance the public's knowledge about food, which may have a direct impact on the utilization of food and on the sustainability of food security over time.

However, tensions are present in the different policy frameworks of public procurement. In Europe, for instance, green public procurement is based on the recognition that the market may fail to deliver health, environmental and social benefits for all; however, this recognition is not translated into a consistent engagement of the state in demand management. Indeed, predominant neoliberal frameworks (defined by competition laws and free trade agreements, among others) neglect the role that states may play in shaping the demand for food (supposedly to protect consumers' freedom), and instead focus on the development of more efficient supply chains. Against this background, examples like East Ayrshire emerge as isolated best practices, driven by context-dependent (and often temporary) factors such as leadership and political will. This points to the role that governments at various levels can play in supporting local sustainability initiatives and incorporating their strengths into national and global development policies (Morgan and Sonnino, 2013).

The case of the GSFP programme highlights the shortcomings of a top-down approach to the design and delivery of public food systems that aim to promote food and nutrition security. It demonstrates the importance of creating platforms for policy discussion, unifying the actors in the various sectors involved (at all governance levels) to strengthen coordination and communication. By enabling all stakeholders to carry out their roles in an effective manner, such platforms can help overcome implementation problems and avoid an uneven geography of school feeding programmes across a country (see Kelly and Swensson, 2017).

This chapter reviewed the academic literature on the contribution of public food systems to food and nutrition security and analysed two practical examples, highlighting the need to institutionalize public food systems – that is, to embed them more formally in the multi-level food governance systems. Both in developed and in developing countries, the capacity of a public food system to produce even benefits across space and time depends on the coordination between actors at all levels. A first key step towards coordinated policymaking is the recognition that public procurement has a unique potential to further food and nutrition security and make food systems more just, both socially and environmentally.

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2 PUBLIC FOOD PROCUREMENT AS A DEVELOPMENT TOOL: THE ROLE OF THE REGULATORY FRAMEWORK

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ABSTRACT

While from a policy perspective it seems widely recognized practice to incorporate the pursuit of sustainable development in public procurement practices, the law seems to be still lagging behind in fully embracing this perspective. The present chapter addresses this issue by analysing how regulatory design can support the incorporation of development considerations in public food procurement practices. The chapter examines a number of international regulatory frameworks for public procurement and their evolution towards the recognition and promotion of sustainable development. Regulatory instruments to incorporate development objectives in public food procurement in three countries (Brazil, France and the United States of America) are explored as case studies. The chapter presents a discussion on the reach of these instruments and offers some reflections on possible regulatory pathways that ensure that food procurement schemes achieve maximum development outcomes.

2.1 Introduction

Although it is not a new phenomenon, the interest in the use of public procurement as an instrument to pursue development goals has grown significantly in recent decades. The weight of the public sector in national economies is important, and procurement by public institutions can therefore act as an important lever for change.

On average, public procurement accounts for 13 percent of gross domestic product (GDP) in low-, medium- and high-income countries (World Bank, 2020).[1]

Food procurement occupies a prominent position in the emerging trend to use public procurement as a tool for development, and accounts for a significant portion of overall public procurement. Public food procurement initiatives can take different forms, including public school meal programmes, the provision of food and food-related services in the cafeterias of public offices, hospitals, prisons and universities, as well as social programmes such as in-kind transfers (the distribution of food aid to families in need) or social restaurants.

Examples of development policy objectives commonly pursued through public food procurement initiatives include supporting and promoting local agricultural production, supporting vulnerable producer groups (in particular smallholder farmers, but also women, indigenous peoples and small and medium food enterprises), and promoting agricultural production practices that ensure environmental sustainability and promote biodiversity. In addition, public food procurement initiatives increasingly target nutrition and health outcomes (Morgan and Sonnino, 2008; De Schutter, 2014; Global Panel on Agriculture and Food Systems for Nutrition, 2015; Fitch and Santo, 2016; Swensson and Tartanac, 2020).

The significant rise in the number of food procurement policies and programmes adopted in various countries over the past two decades attests to the increased awareness of the linkages between public food procurement and development.

In Brazil, the National School Feeding Programme (Programa Nacional de Alimentação Escolar or PNAE) reaches approximately 41 million children in public primary and secondary schools, with important positive impacts on their nutrition (and thus on their learning abilities). Since its reformulation in 2009, PNAE has also had a significant impact in terms of rural development and improved small-scale farmers' incomes, among others (Sidaner, Balaban and Burlandy, 2013; Swensson, 2015; Schneider *et al*., 2016; Brazil, National Fund for Educational Development [FNDE], 2020) (see also Chapters 8, 9, 10, 11, 12 and 14 of this book).

[1] Data for 190 countries do not show significant differences between the weight of public procurement in low-, medium- and high-income economies; however, there are significant differences within income groups. Indeed, public purchasing accounts for 6 to 28 percent of GDP in middle-income countries and for 5 to 26 percent of GDP in low-income countries (Bosio and Djankov, 2020; World Bank, 2020).

In Ethiopia, a pilot home-grown school feeding programme was launched in 2012 (see Chapter 19 for an analysis of the Ethiopian experience). By 2018, the programme was feeding approximately 139 000 students in 238 schools, with food sourced from smallholder farmers through cooperative unions at a local level (Swensson, 2019). In 2015, a similar programme was launched in the country as an emergency measure to mitigate the impact of severe drought conditions on schooling; this programme reached about 1.8 million children in 2018 (Swensson, 2019).

In India, the Public Distribution System (PDS) has traditionally served to keep food prices low by establishing a network of government warehouses and food retail outlets that ensure access to major staple food grains at subsidized prices (see Chapter 31). While the scheme initially did not target specific population groups, it was transformed in 1997 into the Targeted Public Distribution System (TPDS). The system, which comprises "fair price shops" for the distribution of food grains at subsidized prices, currently reaches about 300 million households below the poverty line. Since 2013, TPDS has been diversifying its food basket to include coarse cereals and underutilized species. This change has boosted the programme's potential to improve the nutrition of the overall population and strengthen the resilience, capacity for income generation and empowerment of smallholder farmers. There are many other examples of national programmes that have sought to strengthen the linkage between public food procurement and development (see Chapters 22 to 35 of this book).

While from a policy perspective it seems widely recognized practice to incorporate the pursuit of sustainable development in public procurement practices, the law seems to be still lagging behind in fully embracing this perspective. In addition, the importance of the law and regulatory design to the implementation of public procurement initiatives is often overlooked in debates on food procurement and rural development (Brooks, Commandeur and Vera, 2014; Swensson, 2018, 2019).

The present chapter addresses this issue by analysing how regulatory design can support the incorporation of development considerations in public food procurement practices. It is based on the premise that the question is not *if* public procurement law should allow for the deliberate pursuit of development goals in relation to food, but rather *how* they should do so i.e. which regulatory design is most likely to achieve this aim.

This chapter is organized in three main sections. A first section analyses key international regulatory frameworks for public procurement, their evolution towards the recognition and promotion of public procurement as a development tool, and the various instruments available. A second section focuses on food; it studies experiences in three countries (Brazil, France and the United States of America) with regard to regulatory instruments to incorporate development objectives into specific food procurement initiatives. A third section presents a discussion on the reach of these instruments and offers some reflections on possible regulatory pathways to help food procurement schemes achieve maximum development outcomes.

2.2 Public procurement as a tool for development

The (re-)emergence of public procurement as a tool for development

McCrudden, one of the leading scholars on the linkages between public procurement law and social policy has argued that:

> *Since modern procurement systems evolved alongside the development of the welfare state … it is hardly surprising that the former was used in part to underpin the goals of the latter (McCrudden, 2004, p. 258).*

Indeed, there is a long history of public procurement being used to promote a range of domestic development objectives (McCrudden, 2007). However, since the 1960s, the growth of a free trade ideology has increasingly shifted the focus of procurement systems away from domestic objectives to embrace non-discrimination between suppliers as their primary animating feature (Morlino, 2019). At the international level, efforts to harmonize public procurement laws over the past four decades have thus largely focused on opening up global procurement markets to free trade.

More recently, however, governments increasingly understand how they can use the public purse to achieve sustainable development outcomes, including improved nutrition and rural development. Sustainable public procurement was identified as a key area of work in the 10 Year Framework of Programmes (10YFP) on Sustainable Consumption and Production Patterns, which is mandated by the Johannesburg Plan

of Implementation adopted at the 2002 World Summit on Sustainable Development (United Nations Department of Economic and Social Affairs [UN DESA], 2008).

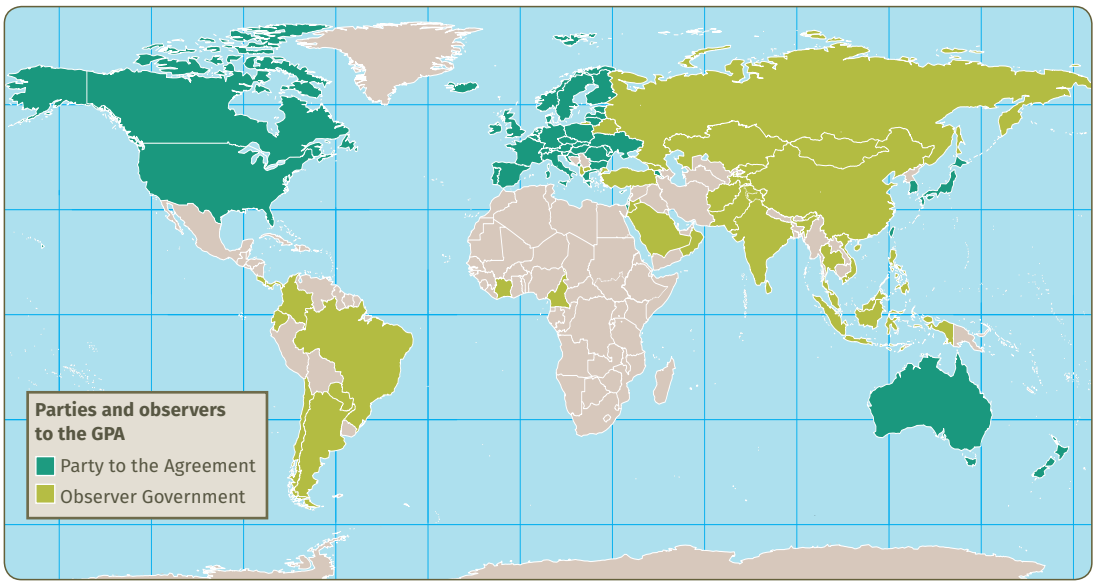
In 2011, the United Nations Secretary-General recalled that procurement can "harness the power of the supply chain to improve people's lives." He emphasized that the enormous purchasing power of international organizations – the United Nations (UN) bought USD 14.5 billion worth of goods and services in 2010, for example – can exert a positive influence on economic systems to the benefit of people (United Nations Office for Project Services [UNOPS], 2011). The UN 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDG) explicitly recognize the link between public procurement and sustainable development (SDG 12.7). The United Nations Committee on Economic, Social and Cultural Rights (CESCR) has highlighted the potential of public procurement to encourage businesses to contribute to the fulfilment of human rights, in particular by acting with due diligence to ensure compliance with human rights in supply chains (CESCR, 2017).

This renewed interest in the use of public procurement for sustainable development has led policymakers to pay increased attention to the linkages between regulatory frameworks for public procurement and development (Stoffel *et al*., 2019; Quinot, 2018). Earlier frameworks were premised on the need to ensure non-discrimination between suppliers and avoid any distortions of competition. Meanwhile, second-generation frameworks are designed to promote the use of public procurement for sustainable development.

Evolution of public procurement regulation within the framework of the World Trade Organization

Within the World Trade Organization (WTO) framework, public procurement is regulated by the Agreement on Government Procurement (GPA), which imposes certain restrictions on the public procurement policies of the parties (GPA does not apply to purchases by private entities). The agreement ostensibly aims to avoid discriminatory practices and distortions of competition in the awarding of public contracts above the minimum threshold negotiated by each party. The GPA is a plurilateral agreement: it does not apply to all WTO members, but only to those members that have signed it (see Figure 1).

Figure 1 **Signatory parties to the WTO's Agreement on Government Procurement (GPA)**



Source: WTO, 2020 and United Nations Geospatial Information Section, 2020.

Note: The countries that are parties to the current GPA include the 27 member states of the European Union, as well as Armenia, Australia, Canada, Hong Kong (China), Iceland, Israel, Japan, the Republic of Korea, Liechtenstein, the Republic of Moldova, Montenegro, the Netherlands with respect to Aruba, New Zealand, Norway, Singapore, Switzerland, Taiwan (Province of China), Ukraine, the United Kingdom of Great Britain and Northern Ireland and the United States of America. In addition, Albania, China, Georgia, Jordan, Kazakhstan, Kyrgyzstan, North Macedonia, Oman, the Russian Federation and Tajikistan are in the process of acceding to the agreement. Most recently, Brazil has declared its intention to the join GPA. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties.

Although WTO rules are routinely invoked by governments to justify their refusal to use public purchasing to pursue development outcomes, the GPA contains important flexibilities that allow them to do so – especially since 2014, when the agreement was revised to improve its compatibility with the objective of sustainable development. The revised Agreement on Government Procurement of 2012 allows the inclusion in public tenders of considerations that are not purely economic.[2] Indeed, Article X allows procuring entities to lay down technical specifications, including specifications

[2] Specific thresholds have been negotiated by each party and range between SDR (Special Drawing Rights) 130 000 and SDR 15 million (or approximately USD 202 800 to USD 23.4 million according to the exchange rate at the time of writing in 2020).

relating to process and production methods, as long as they do not create unnecessary obstacles to international trade. This provision does not distinguish between product-related and non-product-related specifications.

In other words, specifications in public tenders need not focus exclusively on the physical characteristics of goods or services but may also concern how (under which conditions) they were produced. Parties to the GPA may thus introduce clauses concerning labour rights or environmental standards in their public procurement schemes – indeed, the revised text contains an important new provision (Article X.6) that explicitly allows public authorities to adopt technical specifications to promote the conservation of natural resources or protect the environment. Although Article X.6 does not specifically mention other "secondary" policy objectives, its wording makes it clear that objectives such as the protection of labour rights or the need to increase marketing opportunities for small-scale farmers, for example, may also be taken into account. This is not to say that signatories to the GPA may do as they please in this regard. Article X.2(b) of the revised GPA stipulates that technical specifications must be based, where appropriate, on international standards, and that they must be specified in terms of performance rather than design or descriptive characteristics. In addition, they may not specify particular brand names, producers or suppliers, except where there is no other intelligible way of describing the procurement requirements; in that case, words such as "or equivalent" must be inserted in the tender.

One important limitation to the inclusion of non-economic considerations in public procurement regulations is that signatories to the GPA may not discriminate between suppliers from countries that are signatory parties to the agreement. Indeed, signatories to the GPA commit to:

> *Accord immediately and unconditionally to the goods and services of any other Party and to the suppliers of any other Party offering the goods or services of any Party, treatment no less favourable than the treatment the Party, including its procuring entities, accords to: (a) domestic goods, services and suppliers [national treatment principle]; and (b) goods, services and suppliers of any other Party [most-favored nation principle] (Article IV.1 of the revised GPA).*

In addition, Article VIII.1 of the revised GPA states with respect to the qualification of suppliers that:

> *A procuring entity shall limit any conditions for participation in a procurement to those that are essential to ensure that a supplier has the legal and financial capacities and the commercial and technical abilities to undertake the relevant procurement (Article VIII.1 of the revised GPA).*[3]

Furthermore, although the GPA allows for the adoption of a preference scheme (price preference), it limits its adoption to specific circumstances. The possibility of giving preferential treatment to national products is allowed only as an exceptional and transitional measure to be adopted exclusively by developing countries "based on their development needs, and with the agreement of the Parties" when accessing the agreement (Article V.3.a of the revised GPA). These provisions aim to prevent procuring entities from granting preferential treatment to certain suppliers on the grounds that this would be arbitrary or may result in discrimination. They should not be seen, however, as prohibiting the use of purchasing programmes to contribute to poverty-reduction objectives, for instance by giving priority to small-scale farmers and/or farmers who rely on agroecological techniques. Indeed, contracting authorities may define the ability to supply products that respect certain social criteria as an essential requirement (Spennemann, 2001). They may also include ethical requirements in contracts, for instance compliance with labour rights or environmental specifications (McCrudden, 2007; Arrowsmith, 2003; Hoekman and Mavroidis, 1997).

Nothing in the text of Article VIII(b) of the GPA of 1994 and Article VIII.1 of the revised GPA seems to prohibit governments from pursuing social objectives through their procurement schemes, especially if one considers the notions of a supplier's "capability" (in the 1994 version) or "legal and technical capacity" (in the revised text) in the light of current practices of governments. Indeed, Article VIII.4 of the revised GPA deliberately opts for a non-limitative list of grounds for exclusion of certain tenderers ("grounds such as …"), which suggests that governments may choose to define any other grounds to disqualify certain suppliers. The key requirement is that any exclusion criteria be defined transparently, to avoid any arbitrariness or

[3] This condition was included in broader terms in the original version of the GPA. Article VIII(b) of the GPA of 1994 stated that "any conditions for participation in tendering procedures shall be limited to those which are essential to ensure the firm's capability to fulfil the contract in question." For a comparison of the 1994 and 2014 versions of GPA, see Reich (2009).

discrimination in the choice of suppliers. With respect to the award criteria, Article XV.5 of the revised GPA specifies that procurers may decide to award the contract either to the "most advantageous" tender or to the tender with the lowest price ("where price is the sole criterion"). Non-economic considerations may thus play a role in the selection of suppliers. The procuring entity may take social and ethical considerations into account when determining the value of tenders, and the concept of "most advantageous" must include award criteria of a non-economic nature.

Meanwhile, the GPA does forbid signatories from imposing the condition that goods or services must be sourced locally. Indeed, making reference to the domicile of the supplier (or, in the case of food, to where food is grown or processed) may be seen as indirect discrimination against foreign suppliers. To circumvent that prohibition, many local public authorities will be tempted to issue public tenders for amounts that fall below the threshold beyond which the GPA applies.

When a programme is too large and procurement exceeds the thresholds above which the GAP applies, procurement can be broken down into smaller volumes. This allows producers to submit a proposal for only one product or for a small volume and favour the participation of small producers. This, for instance, is what the French Ministry of Agriculture and Food recommends in a practical guide addressed to local public authorities. The aim of this recommendation is to encourage local authorities to favour local, high-quality procurement for organizations such as schools, hospitals or administrations (France, Ministry of Agriculture and Food, 2014) (see Section 3).

In the specific case of food procurement, it is interesting to note that a number of countries have expressly excluded the procurement of agricultural goods for human feeding programmes from the coverage of the agreement. This is the case, for instance, for Canada, the United States of America and the member states of the European Union. The Notification of the United States of America annexed to the GPA establishes that "this Agreement does not cover procurement of any agricultural good made in furtherance of an agricultural support programme or a human feeding programme." A similar provision is made by the member states of the European Union. This exception allows the United States of America to include a specific geographical preference in tenders for the purchasing of locally grown or locally raised agricultural products for child nutrition programmes funded by the government (see Section 3).

The European Union regulatory framework for public procurement

Just as the WTO's GPA was revised to give more flexibilities to public entities seeking to use public purchasing as a tool to achieve sustainable development, the European Union's regulatory framework has gradually opened up possibilities for public authorities to include non-economic considerations in public tenders. References to the imposition of environmental and social conditions were initially already included in two Directives concerning public procurement adopted in 2004.[4] For instance, Article 26 of Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts stipulated that "the conditions governing the performance of a contract may, in particular, concern social and environmental considerations." This provision was seen as a welcome clarification at the time, since the inclusion of such considerations in public procurement had led to case law by the European Court of Justice that left a number of questions of interpretation unanswered (Arrowsmith and Kunzlik, 2009).

The 2004 Directives remained unclear, however, as to whether national authorities could include non-economic conditions other than those related to social or environmental considerations as criteria for the qualification of tenderers or for the awarding of contracts. The debate was relaunched in 2008 as a result of two factors. The first factor was the publication of a communication from the European Commission listing a number of recommendations as to how the public procurement framework could be interpreted to encourage "green purchasing" (European Commission, 2008).

The second and more crucial factor was the controversy that followed the issuance, by the Dutch province of Groningen, of a public tender for the supply and management of automatic coffee machines that included a reference to fair trade labels. The tender stipulated, *inter alia*, that the coffee had to be produced by smallholders, who must be paid a minimum price and a price premium for social development.

[4] See Article 53(1)(a) of Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 on the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts, and Article 55(1)(a) of Directive 2004/17/EC of the European Parliament and of the Council of 31 March 2004 coordinating the procurement procedures of entities operating in the water, energy, transport and postal services sectors.

The tender referred explicitly to products bearing the EKO and Max Havelaar labels;[5] moreover, it required tenderers to comply with the "criteria of sustainability of purchases and socially responsible business" and demonstrate, *inter alia*, that they contribute to improving the sustainability of the coffee market and to environmentally, socially and economically responsible coffee production (*European Commission v Kingdom of the Netherlands*, 2012).

Douwe Egberts, a mainstream coffee roaster, protested that these requirements effectively excluded them from the tender, because its coffee, though certified by the UTZ label, did not comply with all the conditions. The case finally reached the Court of Justice of the European Union, which took the view that the Dutch authorities had established a technical specification incompatible with Article 23(6) of Directive 2004/18/EC by requiring certain products to bear a specific ecolabel (*European Commission v Kingdom of the Netherlands*, 2012). Indeed, Article 23(6) sets out strict conditions for the use of ecolabels, including the condition that any reference to a particular ecolabel should be accompanied by a description of the technical specifications associated with that label, to allow tenderers to prove compliance with such specifications without having to acquire the actual label. At the same time, however, the Court did accept that "the conditions governing the performance of a contract may, in particular, refer to social considerations" and that "to require that the tea and coffee to be supplied must come from small-scale producers in developing countries, subject to trading conditions favourable to them, falls within those considerations."[6] Article 53(1)(a) of Directive 2004/18/EC states that when contracting authorities award tenders to the most economically advantageous tenderer, "various criteria linked to the subjectmatter of the public contract in question" can be taken into account, including, for example:

> *quality, price, technical merit, aesthetic and functional characteristics, environmental characteristics, running costs, cost-effectiveness, after-sales service and technical assistance, delivery date and delivery period or period of completion.*

[5] The tender specifically stated that "the province of North Holland uses the Max Havelaar and EKO labels for coffee and tea consumption" as part of the conditions imposed on potential suppliers.

[6] *European Commission v Kingdom of the Netherlands*, 2012 (paragraph 76).

Hence, the Court argued that social considerations may be part of the criteria on which the award decision is based: "there is no requirement that an award criterion relates to an intrinsic characteristic of a product, that is to say something which forms part of the material substance thereof."[7]

In 2014, a new general Directive on public procurement was issued (Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement and repealing Directive 2004/18/EC). This Directive not only confirms the case law of the Court of Justice of 2012, but was also specifically designed to encourage the use of public procurement to realize the policy objectives of the Europe 2020 agenda.[8] Indeed, the new instrument was adopted with the explicit aim to allow for a greater use of public procurement to support a set of:

> *common societal goals such as protection of the environment, higher resource and energy efficiency, combating climate change, promoting innovation, employment and social inclusion and ensuring the best possible conditions for the provision of high quality social services (European Commission, 2011, p. 2).*

The Directive, which was strongly supported by civil society groups (ClientEarth, 2011, 2012a, 2012b), promotes the use of public procurement for societal goals in two ways.

First, it contains provisions that aim to facilitate the access of small and medium-sized enterprises to public procurement, for example by creating the possibility for public authorities to divide large contracts into smaller lots that are more manageable by such suppliers. While recognizing purchasers' tendency to pursue economies of scale and aggregate orders to command lower prices and reduce transaction costs, the Directive warns about the negative effects of such practices upon small and medium-sized suppliers and encourages public procurers to divide large contracts into smaller lots that better correspond with the capacities of small-scale enterprises.

Second, the new Directive broadens the range of criteria that may be included in the definition of the object of the procurement and used as criteria to award a contract. Public authorities are authorized to adopt a life-cycle approach to the product, service

7 *European Commission v Kingdom of the Netherlands*, 2012 (paragraphs 89–91).

8 See in particular Recital 2.

or work object of the procurement and include a wider range of factors (including social and environmental factors) in the assessment of the most "economically advantageous" tender (Article 42 and Article 68). It is especially noteworthy that Article 42(1) sub.2 of the directive provides that:

> *characteristics may ... refer to the specific process or method of production or provision of the requested works, supplies or services or to a specific process for another stage of its life cycle even where such factors do not form part of their material substance provided that they are linked to the subject-matter of the contract and proportionate to its value and its objectives.*

As specified in Article 42(1), sub. 2 the notion of life cycle refers to the steps "from raw material acquisition or generation of resources to disposal, clearance and end of service or utilisation." The same variety of criteria may also be used to assess tenders and award contracts (Art. 67 to 69).

The reference to existing ecolabels may be a convenient way to ensure that economic operators comply with certain technical specifications. Indeed, Article 43 of Directive 2014/24/EU specifically allows for the use of such ecolabels (as did Article 23(6) of Directive 2004/18/EC), while clarifying the conditions for such references in the technical specifications attached to calls for tender. These conditions include the requirement that the label requirements "are based on objectively verifiable and non-discriminatory criteria"; moreover, the public authorities "requiring a specific label shall accept all labels that confirm that the works, supplies or services meet equivalent label requirements." Where the supplier cannot acquire the label in time for reasons that are not attributable to them, Article 43 determines that the contracting authorities must:

> *accept other appropriate means of proof, which may include a technical dossier from the manufacturer, provided that the economic operator concerned proves that the works, supplies or services to be provided by it fulfil the requirements of the specific label or the specific requirements indicated by the contracting authority.*

This provision incorporates the lessons learned in 2012, with the judgment in *European Commission v Kingdom of the Netherlands*.

The Directive creates the possibility to reserve certain procurement opportunities to specific categories of suppliers (i.e. reservation schemes) as an instrument to help vulnerable supplier groups access public contracts (Article 20). This tool is based on the recognition that certain types of suppliers are not able to participate under normal conditions of competition (Recital 36). Nevertheless, the Directive limits its use to sheltered workshops and other social businesses whose main aim is to support the social and professional integration of the disabled and the disadvantaged (i.e. the unemployed, members of disadvantaged minorities or otherwise socially marginalized groups).

The member states of the European Union and subnational authorities are now explicitly encouraged to use public procurement to achieve the Sustainable Development Goals, in particular by prioritizing products and services that minimize the use of resources and are the most efficient (European Commission, 2017). Good practices for public purchasing, and particularly regarding food purchasing, are increasingly well known; they inspire public authorities across Europe (Soldi, 2018).

The developments in the European Union provide a remarkable illustration of the shift that has taken place over the past decade. The European Union has moved from an approach to public procurement legislation that chiefly aimed to prevent any distortion of competition, to one that sees public procurement as a tool to encourage sustainable development. Improving marketing opportunities for smaller enterprises, including small-scale farmers, is part of that shift; the insertion of environmental requirements (in the technical specifications attached to calls for tender or as part of the performance requirements or award criteria) is another component.

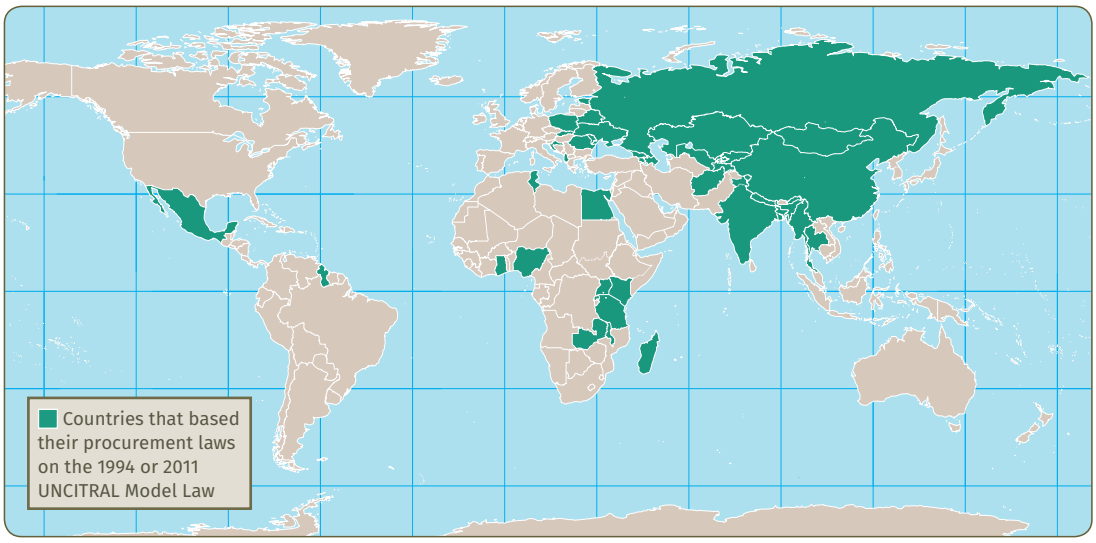
Evolution of public procurement regulation within the UNCITRAL Model Law

The United Nations Commission on International Trade Law (UNCITRAL) Model Law on Public Procurement is, alongside the WTO's GPA, the main international instrument for public procurement regulation. Given the overarching mandate of UNCITRAL to "further the progressive harmonization and unification of the law of international trade" and thereby "remov[e] legal obstacles to the flow of international trade" (United Nations General Assembly Resolution 2205 (XXI) of 17 December 1966), the

Model Law sits squarely within the free trade paradigm of public procurement that has emerged internationally since the 1960s.

Like the WTO GPA, the Model Law aims to facilitate international trade by avoiding discrimination against foreign suppliers and harmonizing procurement practices (Nicholas, 2017). Unlike the WTO GPA, the Model Law does not prescribe procurement rules; instead, it merely provides a template procurement law that countries can use when formulating domestic laws. The original Model Law dealing with public procurement was adopted in 1993; it was replaced by an extended version in 1994 and a fully revised version in 2011. The Model Law has been quite influential, especially in the developing world – unlike the WTO GPA. UNCITRAL records that the 1994 Model Law formed the basis of domestic procurement statutes in 30 countries, and the 2011 Model Law in 25 countries. Experience has shown that because of legal transplants between countries (i.e. the "borrowing" or moving of a rule of law from one country to another), the influence of the Model Law is even more extensive (Caborn and Arrowsmith, 2013). The vast majority of the countries that have used the Model Law are developing countries, including many in Africa.

Figure 2 **Countries with procurement laws based on the 1994 or 2011 UNCITRAL Model Law**



Source: WTO, 2020 and United Nations Geospatial Information Section, 2020.

While the Model Law is explicitly aimed at facilitating international trade, and thus places primary emphasis on open competition and value for money, it is not hostile to the use of public procurement for other policy goals, such as development. In the *Guide to enactment* that accompanies the Model Law, UNCITRAL states that it:

> *recognizes … that procurement policymaking and implementation are not undertaken in isolation … [and] the Model Law enables the pursuit and implementation of other government policies and objectives through the procurement system" (UNCITRAL, 2012, p. 4).*

In this respect, the 2011 revised Model Law represents an important development compared to the 1994 Model Law. The revised law introduced the concept of "socioeconomic policies," which is defined as "environmental, social, economic and other policies of this State authorized or required by the procurement regulations or other provisions of law of this State to be taken into account by the procuring entity in the procurement proceedings." The 2011 Model Law also introduced a new general provision on evaluation criteria (Article 11). This provision allows contracting authorities to take any criteria into account when evaluating tenders – including socioeconomic policies (Nicholas, 2012) – as long as such criteria are authorized by law (Article 11(3)). Criteria other than price, cost and supplier competence do not have to relate to the subject matter of the procurement (Article 11(1)). Article 11(3)(b) also explicitly allows for any form of preference in evaluating bids. The 2011 Model Law allows for single-source procurement if such a method is necessary to implement a particular socioeconomic policy and no other supplier can fulfil that policy (Article 30(5)(e)).

The *Guide to enactment* warns that while the Model Law allows socioeconomic policies to be pursued through public procurement, the restrictions that such practices may place on competition within the procurement system may have negative consequences. The guide therefore recommends that any restrictions placed on open competition to promote socioeconomic policies should be viewed as transitory measures, and must not lead to protectionism (UNCITRAL, 2012). Despite the increased acceptance of a range of (social) policy objectives in public procurement, the UNCITRAL Model Law thus continues to view the use of public procurement in pursuit of socioeconomic policies as "an exceptional measure" (UNCITRAL, 2012, p. 6).

Regional regulatory frameworks in Africa

The UNCITRAL Model Law has influenced the development of procurement law in many African countries (Caborn and Arrowsmith, 2013). Not surprisingly, regional regulatory frameworks for public procurement in Africa have also been heavily influenced by the Model Law. The most comprehensive of these frameworks are the public procurement regulations of the Common Market for Eastern and Southern Africa (COMESA). In 2001, the 21-member trade bloc (the largest in Africa) embarked on a major project of reforming public procurement within the bloc, with the twin objectives of facilitating trade between members and improving governance in member states (Karangizi, 2005). In 2003, COMESA adopted a directive on public procurement containing "the principles and essential components of national legal frameworks" for the procurement systems of member states (COMESA Public Procurement Reform Project, 2003). This was followed in 2009 by the COMESA Public Procurement Regulations, constituting a regional procurement framework for regional competitive bidding.

The 2003 Directive paid very little attention to the incorporation of socioeconomic policy objectives in public procurement, but did not bar it. The Directive contained provisions dealing with preferences for domestic suppliers and small and medium enterprises. It provided that open tendering should be considered the paradigm procurement method and that restricted forms of procurement, including for purposes of socioeconomic policy considerations, should be limited to exceptional circumstances. The 2009 regulations are completely silent on the use of procurement as a tool for development.

A question of regulatory design

Questions are often raised about the desirability of using public procurement to pursue public policy objectives (Quinot, 2013; Schooner and Yukins, 2009). The argument is typically that such use of procurement, referred to as horizontal policy objectives, leads to protectionism because it invariably restricts competition; hence, it must be avoided. However, it is axiomatic that public procurement is never free of public policy considerations. After all, public procurement is never an end in itself, but always a means to achieve a public policy objective. At the most fundamental level, public procurement thus always stands in service of public policy.

But even one step beyond this inherent public policy objective, policy looms large in procurement. The use of the free trade agenda to criticize horizontal policies in procurement itself illustrates this point. Indeed, the argument against horizontal policies in public procurement in favour of open competition is not a policy-neutral argument. It is an argument in support of a particular economic policy, in other words that of free trade and market integration. The international hegemony of this particular policy position has dominated public procurement regulation paradigms over the past four decades. As a result, the pursuit of other policy agendas, such as social development, has been portrayed as suspect and to be dealt with as exceptions in international public procurement regulatory regimes.

However, the past few years have seen a shift in the hegemony of free trade at the international policy level. Powerful counter-narratives now place the focus on development, and especially sustainable development. At least from the perspective of policy, it has become less objectionable to incorporate sustainable development objectives (and particularly those related to environmental and social policies) in public procurement practices. However, the law seems to be lagging behind in fully embracing this perspective.

From a regulatory perspective, the relevant question should thus not be whether public policy considerations relating to development should be incorporated in public procurement, but rather what is the most appropriate regulatory design for such practices. Arguably, some regulatory approaches or instruments are better suited for particular developmental objectives than others (Quinot, 2018). It is therefore worthwhile to explore a particular area of linkages between public procurement and development, such as public food procurement, to determine what the most appropriate regulatory design for achieving maximum developmental outcomes in that area would be. In short, the appropriate question is not *if* public procurement law should allow for the deliberate pursuit of development through food procurement, but rather *how* public procurement law should do so.

2.3 Food procurement

Food procurement and its potential to contribute to sustainable development

Within the emerging trend of the use of public procurement as a tool for development, food procurement occupies a prominent position. Over the past two decades, the recognition at policy level of the potential that public food procurement initiatives have to pursue development outcomes has been growing. The many country experiences discussed in this book are a testimony to this evolution.

The potential of public food purchasing to contribute to development depends on the choices made by policymakers and procuring entities as to:

- the type of food to purchase (such as local, fresh, diversified and nutritious food);
- the type of production practices from which to purchase (e.g. from agricultural production that ensures environmental sustainability and promotes biodiversity); and, in particular,
- the type of suppliers from whom to purchase (e.g. from local and/or smallholder food producers) (De Schutter, 2014; Tartanac *et al.*, 2020).

Considering the weight of public sector demand for food and depending on how these choices are made, is widely recognized that public food procurement has a considerable potential to influence both food consumption and food production patterns and deliver multiple social, economic, environmental, and nutritional and health benefits for a multiplicity of beneficiaries, including food producers, food consumers and the wider community (Morgan and Sonnino, 2008; Foodlinks, 2013; Fitch and Santo, 2016; Swensson and Tartanac, 2020).

Despite policymakers' increasing recognition of food initiatives as a powerful instrument to link public procurement and development, the importance of regulatory design to the implementation of such initiatives is often overlooked in the food procurement debate (Brooks *et al.*, 2014; Stefani *et al.*, 2017; Swensson, 2018).

Decisions such as who to purchase from, what type of food to purchase and from what type of production depends on the choices made by policymakers. However, the implementation of these choices will depend on the public procurement regulatory framework. As stated by Quinot (2013), although the law does not play a significant role in decisions to use public procurement for social, economic or environmental policy purposes, it does shape the way in which these policies are implemented, in other words, it plays an important role in the designing of the mechanisms used to implement the policies.

Multiple country studies show how regulatory frameworks may act as a significant barrier to the use of food procurement for development, especially by influencing the choice of the type of suppliers from whom to purchase (e.g. from local and smallholder food producers) (see Box 1, as well as Chapters 9, 15, 16 and 19 of this book).

Recognizing both the potential of linking public food procurement to development and the barriers to implementation that standard public procurement rules can create, countries have adopted different mechanisms and strategies to gear public procurement rules and practices towards development policy objectives, depending on the country context and objectives pursued.

This section discusses examples of different legal instruments and regulatory approaches adopted in Brazil, France and the United States of America. The discussion provides building blocks that may help determine which regulatory design is most conducive to successful policy implementation and the achievement of maximum developmental outcomes.

BOX 1 **Country studies**

A study by the Food and Agriculture Organization of the United Nations (FAO) on the possibilities for direct purchasing from family farmers for school feeding in Latin America concluded that in the eight countries analysed (Bolivia, Colombia, El Salvador, Guatemala, Honduras, Nicaragua, Paraguay and Peru), the complexity of procurement procedures and the requirements of public procurement laws "impose serious obstacles for small-scale producers and their organizations" and "greatly hinder" their access to public food markets (FAO, 2013).

An FAO study offers similar findings for the African content (Kelly and Swensson, 2017). The key challenges that hinder smallholder farmers' access to institutional food markets identified in this study include the complexity and cumbersomeness of the standard open tender procedure, disproportionate and costly participation requirements, an overemphasis on price and other non-smallholder-friendly factors as awarding criteria, and long payment periods. Similar challenges were observed, in the framework of the SNV Netherlands Development Organisation project on procurement governance for home-grown school feeding, which was implemented in Ghana, Kenya and Mali.

According to the findings of this project, public procurement regulations and practices that did not factor in the situation of the region's smallholder farmers constituted one of the main reasons why those countries were not entirely successful in sourcing produce from local smallholders for their school feeding programmes (Brooks *et al.*, 2014). Similar conclusions were reached for Mozambique (Swensson and Klug, 2017) and Ethiopia, in a study that sought to provide information for the alignment of public procurement rules and practices to support government-led home-grown school feeding initiatives (Swensson, 2019).

Source: Swensson, L.F.J. 2018. *Aligning policy and legal frameworks for supporting smallholder farming through public food procurement: the case of home-grown school feeding programmes*. Working Paper No. 177. Rome, FAO, and Brasilia, International Policy Centre for Inclusive Growth. 40 pp. (Also available at **www.fao.org/3/ca2060en/CA2060EN.pdf**).

Public food procurement and regulatory design: country examples

The comparative analysis of regulatory instruments used in countries that have implemented food procurement initiatives for development purposes shows that different approaches can be adopted. On the one hand, there are systems that incorporate specific instruments for food procurement; these are mainly reservation and preferential procurement schemes that allow procuring entities to reserve contractual opportunities to certain suppliers or to adapt the selection process and related rules to give a competitive advantage to targeted suppliers (Watermeyer, 2004). On the other hand, there are systems that rely on existing, non-specific instruments to regulate food procurement.

Brazil and the United States of America are good examples of countries that have developed specific regulatory instruments to support the incorporation of development objectives into public food procurement initiatives. These instruments target specific categories of suppliers (i.e. local and/or smallholder farmers and rural enterprise) and focus mainly on overcoming challenges related to the lack of competitiveness of these types of (vulnerable) suppliers in public markets. France provides an example of the second approach.

Designing specific instruments for food procurement: the cases of Brazil and the United States of America

The revision, in 2009, of the Brazilian National School Feeding Programme (PNAE) by *Lei N° 11.947, de 16 de junho de 2009* (Law No. 11.947 of 16 June 2009) constitutes a milestone in the use of food procurement as an instrument to achieve development objectives (see Chapters 8, 9, 10, 11, 12, 14, 15 and 16 for additional analysis of the PNAE experience in Brazil). Law No. 11.947 is aligned with Brazil's general legislation on public procurement (*Lei N° 8.666, de 21 de junho de 1993* [Law No. 8.666 of 21 June 1993]) that recognizes the promotion of "sustainable national development" as one of the objectives of public procurement (Article 3). Note that Brazil is neither a signatory of the WTO GPA agreement,[9] nor did it use the UNCITRAL Model Law as a basis for its procurement laws.

[9] In May 2020, Brazil submitted an application for accession to the WTO GPA.

Law No. 11.947 establishes specific instruments to use school food procurement as a tool to reach multiple social, economic and environmental policy goals by sourcing food from local family farmers and rural family entrepreneurs (see also Chapters 15 and 16 on the formulation process and the challenges to the implementation of this law). One of the legal instruments established Law No. 11.947 is the reservation scheme, which allows governments to reserve certain procurement opportunities to specific categories of suppliers that satisfy certain prescribed criteria linked to the designated policy objective (Watermeyer, 2004). While standard public procurement rules foresee that all qualified suppliers can tender for a contract, this mechanism creates an exception by allowing only the beneficiaries targeted by horizontal policies to participate in the selection process. The Brazilian law obliges procuring entities to spend at least 30 percent of the budget allocated to them by the federal government for the purchasing of food for school feeding, on food sourced from family farmers and rural family entrepreneurs. The target beneficiaries are defined by *Lei N° 11.326, de 24 de julho de 2006* (Law No. 11.326 of 24 July 2006), which lays down clear eligibility criteria for reservation schemes.

Other regulatory instruments, such as alternative evaluation criteria that acknowledge the social, environmental and economic quality of the food products offered, complement the legal instrument of reservation schemes (Swensson, 2018). Alternative evaluation criteria allow for the prioritization of local, vulnerable (i.e. land reform settlers and members of traditional communities) or organic or agroecological producers as target beneficiaries in the selection process. As such, they widen the range of development objectives that public entities can reach through public procurement, in a manner that is highly food-specific. This approach creates a distinct relationship between the specific policy objectives implemented by means of qualification criteria on the one hand, and those implemented by means of award criteria; this relationship is customized to the context of food procurement. Another regulatory instrument established by Law No. 11.947 is the simplified procurement method ("public call"), which aims to facilitate the access of family farmers and family rural entrepreneurs to public market opportunities (see also Chapter 15).

Another example of the use of specific regulatory instruments to reach development objectives through food procurement comes from the United States of America (see also Chapter 23).

Geographic preferences are not allowed in the general public procurement system in the United States of America. However, in 2008, an exception to this rule was created in the laws governing school food programmes (Public Law 110-246/2008 or the "2008 Farm Bill," and the Code of Federal Regulations) to allow entities receiving funds through the Child Nutrition Programs (CNP) to apply a geographic preference for unprocessed locally grown or locally raised agricultural products, with the objective of supporting local agricultural production.[10]

Preferencing is the legal mechanism that allows governments to give a competitive advantage to a defined category of suppliers within a fully competitive procurement process (Watermeyer, 2004). In contrast to reservation schemes, the selection process is open to any interested supplier, who may compete with the targeted beneficiaries for the contract opportunities. However, preferential treatment is given to suppliers who satisfy certain criteria (e.g. local, small or medium enterprises or smallholder farmers) or commit to specific goals (e.g. caterers who commit to buying from local smallholder farmers) linked to the policy objective that government is targeting. As mentioned above, preference is among the instruments recognized by UNCITRAL, but not among those recognized by the WTO GPA. Contrary to the regulatory framework used in Brazil, the framework in the United States of America allows for the pursuit of policy objectives that are directly linked with the locality of the production, instead of the characteristics of the producers.

Through the preference mechanism, school food authorities in the United States of America are allowed to deviate from the traditional principle of equal treatment of suppliers and give preference to products that are "local," according to the eligibility criteria. Although they still have to compete with other, non-preferred suppliers, local producers have a better chance of winning the contract. The instrument allows purchasers to select suppliers who comply with the eligibility criteria linked to the targeted policy objective but do not offer the lowest price, if they fall within the limits of the preference; thus, the instrument helps overcome challenges linked to the lowest price criterion (Swensson, 2018; De Schutter, 2014).

[10] As mentioned above, although the United States of America is a signatory party to the WTO GPA agreement, the country chose to exclude the procurement of agricultural products made in furtherance of an agricultural support programme or a human feeding programme from the coverage of the agreement.

One of the key characteristics of the system in the United States of America is that the regulation gives procuring entities the power and discretion to create their own definition of "local" and define geographic and other eligibility criteria (United States of America, United States Department of Agriculture [USDA], 2015). This allows school food procurers to tailor their procurement and the preferencing scheme to the broader social, economic and/or environmental goals they aim to reach (see Swensson, 2018).

Building on existing regulatory instruments: the case of France

An alternative regulatory approach is to use existing, general instruments that – while not designed for the specific context of food procurement and the targeting of food suppliers – may support the pursuit of development objectives through public food procurement. France, for example, has adopted this approach (see also Chapter 26 on the French experience).

In France, the objective of linking public food procurement to development is expressly recognized at policy level in the National Food Plan (2004), which is linked to a broader National Action Plan on Sustainable Public Procurement (2015–2020). However, there are no legal instruments (such as reservations or preferencing schemes) that are designed specifically to support the implementation of public food procurement policies and related programmes, and other, general legal instruments are used instead.

The French *Code de la commande publique* (Public Procurement Code) expressly recognizes (in observance of European Union directives) the link between public procurement and development, including its social, economic and environmental dimensions (Articles L2111-1/L3111-1, L2111-2, L2111-3 and R2152-7 of *Ordonnance n° 2018-1074 du 26 novembre 2018* [Ordinance No. 2018-1074 of 26 November 2018]). In 2014, the Ministry of Agriculture and Food issued national guidelines to promote local and quality supply in public catering (France, Ministry of Agriculture and Food, 2014). These guidelines provide advice to public procuring entities on how to use public food procurement as an instrument to promote social, economic and/or environmental development policy goals. They contain specific instructions as to how to use existing legal instruments that, while not designed specifically for

food procurement, may be used to achieve such policy aims. The legal instruments proposed in the guidelines include the:

- division of contracts into smaller and specific lots to allow smaller farmers with limited production capacity to participate (contract lotting);
- rationalization of participation requirements;
- use of alternative procurement methods for amounts under specific thresholds (particularly methods that allow negotiations with potential suppliers); and
- use of multiple evaluation criteria.

In observance of European Union directives, Article R2152-7 of the Public Procurement Code foresees the possibility of using social, economic and environmental evaluation criteria. As laid down in the Code, these criteria may be linked to the fair remuneration of producers, environmental protection, the integration of vulnerable groups in the economy, biodiversity, animal welfare and the direct supply of agricultural products. According to the guidelines, these instruments create a range of possibilities for procuring entities to implement the link between food procurement and various horizontal policy objectives.

Article L2112-2 of the Code allows procuring entities to take into account social, economic and environmental considerations when specifying the conditions of execution of the contract. As such, they may favour supply modes linked to the proximity of production or to environmental outcomes (France, Ministry of Agriculture and Food, 2014). Nevertheless, these requirements cannot lead to any discrimination, and must be linked to the subject matter of the contract. The French legislation does not allow any discrimination based on geographical location (as does the legislation on school food procurement in the United States of America, for example).

France provides an example of a case where some regulatory attention (albeit still general and limited) is paid to the choice of procurement methods and the definition of needs in line with development objectives (Articles L2111-3 and L2111-1/L3111-1 of the Code). The tailored use of general instruments for public food procurement is further steered by the national guidelines on public catering (France, Ministry of Agriculture and Food, 2014).

2.4 Conclusions

The past decade has seen a notable shift in the way in which public procurement law deals with questions of development, and especially sustainable development. This is particularly evident in international legal regimes on public procurement, which have opened up important opportunities to incorporate development objectives into procurement practices. As such, the hegemony of free trade perspectives in international legal instruments on public procurement since the 1960s has given way to a broader policy agenda, focusing on sustainable development.

This shift is important for the use of food procurement as a development tool. While the importance of food procurement in development efforts is widely recognized at policy level, case studies show that regulatory frameworks may act as a significant barrier to the optimal use of food procurement for development. This demonstrates that public food procurement initiatives cannot be used for development purposes without considering their regulatory aspects.

Country studies show that countries may adopt different regulatory approaches to the public procurement of food, both within and outside of international regulatory frameworks. One approach is to develop specific regulatory tools for public food procurement; another is to rely on generic procurement mechanisms within existing procurement rules to pursue development objectives through public food procurement. The two types of approaches are not necessarily mutually exclusive; indeed, they may complement each other in important ways within a single system. The modalities of a system's public food and/or agricultural support programmes are a significant factor in the design of an optimal regulatory regime for food procurement within that system.

Despite the important shifts in regulatory approaches and the promising examples of how procurement law can facilitate public food procurement initiatives, it seems that overall, procurement law still does not optimally leverage policy insights as to the potential of food procurement for development. In other words, regulatory instruments for food procurement do not unequivocally exploit the full potential of policy choices relating to the:

- type of food to purchase (such as local, fresh, diversified and nutritious food);

- type of production practices from which to purchase (e.g. from agricultural production that ensures environmental sustainability and promotes biodiversity); and (in particular)
- type of suppliers from whom to purchase (e.g. from local and/or smallholder food producers) (De Schutter, 2014; Tartanac *et al.,* 2019).

Considering the three perspectives on linking public procurement to development goals put forward by Quinot (2018), current practices to pursue development through food procurement seem to be largely governed by a midstream perspective focusing on the incorporation of development objectives into the public procurement process itself. However, the potential linkages between food procurement and development recognized at the policy level seem to call also for an upstream perspective in regulatory design, focusing on the design of the procurement process itself, and on how this design can further development objectives (Quinot, 2018).

At the policy level, the most important potential contribution of food procurement to development may not necessarily consist in the actual acquisition of food (although that is an important dimension), but rather in earlier policy choices. This is illustrated by the common prejudice that purchasing sustainably produced food (i.e. food produced by small-scale farmers relying on agroecological methods of production) is more costly and will therefore meet resistance from end users. However, it is not necessarily true that sustainable food is more costly. As noted by Soldi:

> *The cost of more "sustainable" meals may be contained by reducing the consumption of meat (for example, through the reduction of meat portions); increasing the use of seasonal vegetables and fruits; reducing food waste (for example, by reusing leftovers); reducing the use of finished or semi-finished products; using recipes that imply the use of the whole foodstuff (for example, vegetable peels). Use of seasonal menus makes it possible to request seasonal and fresh food, which is more likely to be sourced nearby. Variety of menus allows for a wider range of products to be considered in a product group, thus reducing the volumes needed for each product. Smaller volumes are more likely to be supplied by small suppliers (Soldi, 2018, p. 30).*

These examples illustrate how policy choices made when setting up a public food initiative can deliver superior developmental outcomes.

The relevant points discussed in these examples relate not to the adoption of reservation or preferencing schemes for small-scale farmers, but rather to choices pertaining to the formulation of procurement needs, or even to whether procurement is necessary (e.g. in the case of reusing leftovers). In other words, important questions for regulatory design not only concern the regulatory instruments used to approach the market, but also the very nature of procurement to pursue a particular outcome. Thus, paying more attention to demand management from a regulatory perspective may contribute significantly to the achievement of development goals through public food procurement. In addition, the regulatory regime for food procurement must be considered in conjunction with other dimensions of the system, which may be equally important to the achievement of the development objectives. These dimensions include the need to train the staff of procuring entities and suppliers (such as small-scale farmers and their organizations) to help them understand and exploit the opportunities presented by public food procurement initiatives.

From an international trade perspective, it is sometimes argued that the growing emphasis on localized procurement, stemming from policy choices to use public food procurement as a development tool to strengthen urban-rural linkages and reinforce local food systems, may be to the detriment of the very small-scale farmers that these policies aim to support. This argument is premised on the view that allowing procuring entities to geographically limit food procurement may deny small-scale farmers – and especially those from the Global South – access to global supply chains and hence market opportunities. Based on this argument, international procurement rules typically ban (or at least severely restrict) the favouring of local food suppliers in public food procurement. However, from a policy perspective, this argument does not hold. Indeed, it is small-scale farmers who benefit the most from the development of local and regional markets, whereas larger players are better equipped to supply large volumes and reap economies of scale, and thus stand to gain the most from the development of global supply chains. When small-scale farmers do gain access to global supply chains, they do so through large transnational agrifood companies that supply large retailers. The bargaining position of small producers in such supply chains is weak, not least due to the fact that the procurement reach of these dominant actors has now become global. Continuing to support the development of global supply chains at the expense of local and regional markets is therefore not the strategy that is best suited to improve the situation of small-scale farmers.

To conclude, there can be little doubt that public food procurement is potentially a very significant tool in support of transformational development. The case for the use of public procurement for development is well-established at policy level and borne out by case studies across the globe. However, procurement law still seems to be playing catch-up in providing regulatory models that optimally facilitate public food procurement initiatives for development. There are some promising country examples of how procurement law can support such initiatives, while at the international level there is notable momentum to shift procurement regulation towards a broader policy agenda. However, more work remains to be done to develop regulatory regimes that serve optimally as a facilitator, rather than a barrier, for efforts to reach development objectives.

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3 PUBLIC FOOD PROCUREMENT AND THE SUSTAINABLE DEVELOPMENT GOALS

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ABSTRACT

Food procurement policies and practices typically focus on the achievement of singular objectives, such as social (achieving food security, promoting ethical production, improving public health) or environmental goals (mitigating the impacts of food production by reducing carbon emissions and waste). Public procurers should adopt a more integrated approach to public procurement that covers sourcing, consumption and waste management, and considers the food system as an integral part of local, regional and national economies. Such an approach allows food procurement to become a powerful mechanism for delivering multiple policy goals. Life cycle or circular economy thinking is a key to unlocking this potential and enabling the public sector to play an important role in ensuring that achieving the Sustainable Development Goals (SDG) is not just an abstract ambition, but a clear and measurable contributor to green growth.

3.1 Introduction

Public procurement – the purchasing of goods and services by governments and state-owned enterprises – is increasingly used by governments as a strategic tool to deliver their mandates and achieve broad policy objectives. In addition to conforming to standard principles and existing rules, governments are increasingly devoting efforts to increase the efficiency and effectiveness of this key government function. The governments of 159 countries spent an average 16.4 percent of their gross domestic product (GDP) on public purchases in 2018, with percentages ranging from 4 to 38 percent (The GlobalEconomy.com, 2020). As such, public procurement is a potentially significant lever to address market failures. Public food procurement

(PFP) initiatives represent one of the key areas of work of the Food and Nutrition Division (ESN) of the Food and Agriculture Organization of the United Nations (FAO) and of the Sustainable Public Procurement (SPP) and Sustainable Food Systems (SFS) programmes of the One Planet Network (OPN) of the United Nations (UN).

The main focus of FAO's PFP work has been on inclusive public procurement – linking public institutions' demand for food to neglected or vulnerable supplier categories (i.e. local smallholders and small and medium enterprises [SMEs]) to advance social, economic or environmental development goals. In addition, FAO and OPN have been increasingly exploring the multiple potential benefits and beneficiaries of public food procurement under the social, economic and environmental pillars of sustainability). Public procurement can send a signal about governments' ambitions on future directions for food systems that has the power to incentivize supply chain actors and public purchasers to align values and practices accordingly and foster a transition towards sustainable food production and consumption (Tartanac *et al.*, 2019).

The global food service market was estimated to be worth USD 3.4 trillion in 2018 (IMARC, 2019). This is a powerful market force at the local, regional, national or international scale. Because of the sheer value and volume of public food procurement, public institutions have the potential to drive the market and prompt innovation towards the provision of more nutritionally balanced foods and healthier diets in a fair and transparent way. Public organizations account for a significant part of food procurement of any national economy and procure a large portion of the food that people eat every day.

3.2 Green public procurement, sustainable public procurement and circular procurement

Although often used interchangeably, there is a difference between green public procurement (GPP) and sustainable public procurement (SPP). The European Commission defines GPP as the purchase of goods and services with a reduced environmental impact throughout their lifecycle compared to those that would otherwise be procured. SPP is the process by which public authorities seek to balance the economic, social and environmental pillars of sustainable development when procuring goods and services.

Circular procurement goes further by considering not just how good and services are purchased and what the impact of their production is, but also how they are used (consumption) and what value they retain at the end of their life cycle. The European Commission defines this as:

> *... the process by which public authorities purchase works, goods or services that seek to contribute to closed energy and material loops within supply chains, whilst minimizing, and in the best case avoiding, negative environmental impacts and waste creation across the whole life cycle (European Commission, 2017, p. 5).*

This life cycle approach to procurement helps bring together consumption and production as prescribed by Sustainable Development Goal (SDG) 12 *Ensure sustainable consumption and production patterns*, and links naturally to the concept of sustainable food systems.

3.3 Food procurement and the Sustainable Development Goals

Public procurement is a powerful tool for increasing the demand for sustainable products and services. It is specifically referenced in SDG 12.7 *Promote public procurement practices that are sustainable in accordance with national policies and priorities.*

Food loss and waste reduction is a specific target under SDG 12 (SDG Target 12.3). Around a third of all food produced for human consumption is lost or wasted on its way from the farm to the fork (FAO, 2015). This huge level of inefficiency affects many SDGs. Food loss and waste causes about USD 940 billion per year in economic losses. It exacerbates food insecurity and malnutrition as well as overconsumption. The production of food that is ultimately lost or wasted consumes about a quarter of all water used in agriculture. Crops grown to produce food that is ultimately uneaten occupy almost 1.4 billion hectares of land – close to 30 percent of the world's agricultural land area (FAO, 2015).

Procurement acts as the interface between production and consumption – or supply and demand. Sustainable public food procurement is a dynamic policy mechanism that has a role to play in working towards all SDG goals, and some more than others (see Figure 1). The sustainable procurement of food by the public sector arguably contributes most to:

- **GOAL 2:** Zero hunger, for example by aiming to achieve national food security. Food procurement by international programmes such as the World Food Programme (WFP) also contributes to Goal 2. In 2018, WFP bought more than 3.6 million metric tonnes of foodstuffs, for a total value of over USD 1 billion (see also Chapter 22 on the WFP experience).
- **GOAL 3:** Good health and well-being, for example by reducing health inequalities and encouraging choices for nutritious food with a lower dependency on artificial fertilizers, pesticides and other chemicals, such as antibiotics or growth hormones.
- **GOAL 4:** Quality education, for example by providing access to nutritious food in schools, which drives healthier dietary choices throughout life.
- **GOAL 8:** Decent work and economic growth, for example by encouraging fair trade and green growth (fostering economic growth and development while protecting natural assets) across the food supply chain.
- **GOAL 11:** Sustainable cities and communities, for example by favouring local sourcing and closing organic material and nutrient loops in line with circular economy principles (see e.g. Ellen MacArthur Foundation, 2012).
- **GOAL 12:** Sustainable consumption and production, for example by reducing food loss and waste in production and consumption.
- **GOAL 13:** Action on climate change, for example by reducing the carbon footprint of food procurement through short supply chains, consumption choices, e.g. for seasonal produce, dietary choices and better food waste management practices.
- **GOAL 14:** Life below the water, for example through more sustainable seafood procurement policies.
- **GOAL 15:** Life on land, for example through dietary choices, the improvement of animal welfare and stewardship.

Figure 1 **SDGs to which sustainable public food procurement contributes**

Source: United Nations, n.d.-a.

The OPN's SPP programme aims to accelerate the uptake and implementation of sustainable procurement practices at the local, national, regional and worldwide level to ensure sustainable consumption and production patterns and assist in the delivery of SDG 12. It targets SDG 12.1 *Implementing the 10-year framework of programmes on sustainable consumption and production* and SDG 12.7 *Promoting public procurement practices that are sustainable*, in accordance with national policies and priorities.

More than 50 percent of the world's population lives in urban areas; this proportion is projected to reach 66 percent by 2050 (United Nations, n.d.-b). Providing healthy food for everyone in a sustainable way is therefore a challenge that affects cities especially. In 2016, the Food Smart Cities for Development (FSC4D) project, funded by the European Union and supported by 12 urban areas, recommended *inter alia:*

- using public procurement to create market opportunities for local producers and boost the demand for organic food and fair-trade food;
- embedding fair trade into urban food policies to raise awareness among citizens about global interdependences in the food sector and the need for trade justice; and
- setting up local steering groups to ensure local authorities' continued commitment to fair trade in food policies (FSC4D, 2016).

European Union Directive 2014/24/EU on public procurement enables public authorities in the European Union to progressively align their public purchasing with the SDGs. They can do this, for example, by encouraging better trading conditions for, and securing the rights of, marginalized producers and workers – especially in the South – through fair trade. To promote the better integration of social and environmental considerations in procurement procedures, European public procurement rules allow contracting authorities to:

> *use award criteria or contract performance conditions relating to the works, supplies or services to be provided under the public contract in any respect and at any stage of their life cycles from extraction of raw materials for the product to the stage of disposal of the product (European Parliament and Council of the European Union, 2014, p. 84) (see also Chapter 2).*

This recognition of procurement as a strategic policy mechanism is also reflected in the emerging European Green Deal, and specifically in the Farm to Fork Strategy that is at the heart of this action plan (European Commission, 2019; European Public Health Alliance, 2019).

In 2009, the then Ministry of Agricultural Development of Brazil created a label of identification for family farming, which Brazilian fair trade organizations can use to distinguish their products on the national market (Fair Trade Advocacy Office, 2016) (see also Chapters 2, 8, 9, 10, 11, 12, 14, 15 and 16 for additional analysis of public food purchasing in Brazil).

3.4 Other drivers of public procurement of food

As stated by the United Nations Special Rapporteur on the Right to Food, Olivier De Schutter, in 2014:

> *Governments have few sources of leverage over increasingly globalized food systems – but public procurement is one of them. When sourcing food for schools, hospitals and public administrations, Governments have a rare opportunity to support more nutritious diets and more sustainable food systems in one fell swoop (United Nations Office of the High Commissioner for Human Rights, 2014).*

Food security (SDG 2)

A person is considered food secure when he or she has the physical, social and economic access to sufficient, safe and nutritious food that meets his or her dietary needs and food preferences for an active and healthy life (FAO, 2019a). The Organisation for Economic Co-operation and Development (OECD) notes that challenges to achieving food security will be compounded by a growing world population with an increasing appetite for meat and fish, alongside growing competition from non-food agricultural products such as cotton and biofuels.

Better agrifood policies are crucial to improving global food security. Many agricultural policies are maintained with the stated aim of increasing food security; public procurement plays an important part in promoting food security through self-sufficiency in food production.

Public procurement can be used to pursue improvements related to smallholders' livelihoods, food security and nutrition, e.g. by providing an accessible market to smallholders and reducing the risks and uncertainties involved in market participation, the procurement of "women's crops" and using smallholders' products to meet the nutritional needs of target groups such as vulnerable populations (FAO, 2018) (see also Chapter 1).

Health and nutrition (SDG 3)

According to FAO (2016), only a few countries (Brazil, Germany, Qatar and Sweden, for example) have issued dietary guidelines that ensure good nutrition for all and make the link between diets and climate change and other environmental impacts of food production. There is increasingly robust evidence to suggest that dietary patterns that have low environmental impacts can also deliver good health. Linking these drivers creates a win–win situation for governments and public sector bodies that aim to deliver multiple policy goals (FAO, 2016).

Synergies between public food procurement, food security and nutrition can be further promoted when governments purchase target commodities that address the nutritional requirements of vulnerable populations from smallholders. Chapters 1, 4, 5 and 6 of this publication provide good examples of this potential.

Climate change (SDG 13)

Food waste and loss accounts for around 8 percent of global greenhouse gas (GHG) emissions. In Helsinki (Finland), the carbon footprint of each catered meal was estimated at 1.1 kg CO_2 emissions. In Turin, a life cycle assessment approach was taken to measure the carbon footprint of five commonly consumed food products (potatoes, carrots, apples, pears and peaches). For these five supply chains, the production stage accounted for 50 to 75 percent of the total carbon footprint, revealing the significance of agricultural practices in terms of GHG emissions. The requirement to source food from integrated and organic production resulted in a reduction in emissions of over 66 tonnes of CO_2 equivalent – a 26 percent reduction of the carbon footprint throughout the entire supply chain of these five products compared with conventional agricultural systems. The transportation of these five foods, from the farm gate to the table, accounted for 25 to 50 percent of the carbon footprint of the entire chain (INNOCAT, 2015) (see also Chapter 13).

These examples highlight the importance of food supply chains for carbon reduction policies and targets. They also highlight the importance of adopting a sustainable food systems approach as environmental impacts occur across production, processing and distribution and as a result of avoidable food waste and loss.

Biodiversity (SDG 14, SDG 15)

The current food production system is destroying the environment upon which present and future food production depends (FAO and Food Climate Research Network, 2016). Food production currently accounts for some 20 to 30 percent of overall anthropogenic GHG emissions. It is the leading cause of deforestation, land use change and biodiversity loss, accounts for 70 percent of all human water use and is a major source of water pollution. The grazing of livestock and the production of feed crops are the main agricultural drivers of deforestation, biodiversity loss and land degradation. The global reliance on just three crops (rice, wheat and maize) for more than 50 percent of total plant-derived protein production has contributed to the dramatic loss of over 60 percent of biodiversity over the past 40 years (Ellen MacArthur Foundation, 2019) (see also Chapters 11, 12 and 33). Meanwhile, unsustainable fishing practices deplete stocks of species that humans consume and cause wider disruption to the marine environment.

3.5 Sustainable procurement principles for food

Food and farming charity Sustain defines sustainable food as food that is produced, processed and traded in ways that:

- contribute to thriving local economies and sustainable livelihoods – both in [the procuring country] and, in the case of imported products, in producer countries;
- protect the diversity of both plants and animals and the welfare of farmed and wild species;
- avoid damaging or wasting natural resources and contributing to climate change; and
- provide social benefits, such as good quality food, safe and healthy products, and educational opportunities (Sustain, 2020).

In spite of the clear benefits of sustainable public procurement, existing procurement guidance does not adequately promote a systems-based approach to food procurement. Until this gap is addressed, progress will remain incremental rather than transformative. In order to realize the benefits of sustainable procurement, procuring entities and supply chain actors should recognize and implement certain principles that provide a more systematic approach to sustainable food procurement.

Rimmington, Carlton and Hawkins (2006) outline nine principles that relate to corporate social responsibility in procurement:

- Sourcing food products from the country in which they are to be offered, if these products are available in sufficient volumes, appropriate quality and at a competitive price, rather than importing them.
- Providing appropriate menu information and food offerings to consumers so that they can make choices based on food provenance and sustainability.
- Taking relevant steps to avoid the purchase of foods whose production processes (anywhere in the world) are known to excessively damage human health and/or the environment.
- Working with contract catering businesses and intermediate suppliers to find ways to adapt existing centralized purchasing systems to the needs of smaller local and/or regional suppliers.
- Ensuring that food products are processed in facilities that use resources efficiently (i.e. have a reduced consumption of water and energy and minimize waste).

- Ensuring that transportation systems source and distribute food from the point of production/processing to the point of consumption in an energy-efficient way.
- Ensuring that animal food products are sourced from livestock production systems that comply with national standards and with the international standards being developed by the World Organisation for Animal Health (OIE) as they emerge.
- Ensuring that foods offered to consumers are prepared with a minimum amount of additives (including salt and sugar) and providing more information to consumers on additive contents (e.g. as widely done for allergens).
- Working towards the adoption of a organizational code of practice that embraces the principles of the Declaration on the Fundamental Principles of Human Rights at Work of the International Labour Organization (ILO), or, as an alternative, those of the Ethical Trade Initiative's Base Code (which is of specific relevance to imported foods).

This framework of principles applies not only to the organization, city and regional scales, but also to national and international levels. However the emphasis, on public procurement as a mechanism, shifts at these higher levels to a much stronger focus on socially responsible procurement practices that aim to support fair trade practices.

The Belgian city of Ghent identified eight themes for sustainable food procurement that implement these principles in a practical way: organic, vegetarian, fair trade, animal welfare, sustainable seafood, local sourced produce, and food waste reduction (see Figure 2) (Verbeke, 2016). Advocating vegetarian choices implies the need to make dietary choices (e.g. offering less meat). Additional themes could be nutrition (for health reasons) and food packaging (as the food packaging, and particularly plastic packaging, used in the production, processing and transport of publicly procured food direct impacts the environment).

3.6 Food procurement in the public education sector

A well-nourished child is a child that is healthier and better able to learn and develop at school. Food procurement for schools must therefore provide healthy meals to children. The early school years are essential for the adoption of healthy eating habits. Indeed, Morgan and Sonnino (2007) show that eating patterns developed during childhood persist throughout adulthood.

A review of green public procurement (GPP) in 2015 identified the education sector as the sector that most frequently applies new criteria and innovation (Neto *et al.*, 2015). The Maltese Government, for example, identifies the following benefits of the public procurement of healthy food for schools:

- increased availability of and access to nutritious and safe food;
- improved dietary habits and reduced incidence of obesity and overweight;
- positive effects on school attendance and performance;
- minimization of health inequalities; and
- development of health-minded children and school staff.

In Malmö (Sweden) and Copenhagen (Denmark), menus are planned using a slightly different composition of ingredients to enable the purchase of organic food within a conventional budget. This is done by reducing meat, purchasing seasonal food, balancing expensive and cheaper food types and minimising food waste (InnoCat, 2015).

FAO (2019b) has formally recognized the principle of inclusive procurement and value chains as one of the four pillars of its approach to school food and nutrition, which guides FAO's work in this area.

In many countries, schools and governments have issued guidelines regarding portion sizing and age-appropriate menus to address issues related to health, nutrition and obesity (SDGs 2, 3 and 4) and ensure sustainable consumption (SDG 12). An overview of current standards and measures for school meals in the European Union and Norway and Switzerland show that only 13 out of 34 regions/countries link procurement policy and education (school) policies (European Commission, 2020). However, many of the countries that do not yet fully make the connection between well-being and environmental impacts are countries that are often held up as SPP exemplars. This highlights the potential for some quick wins in achieving the objectives of the SDGs through food procurement. It also highlights the need for more countries and public entities to adopt a more strategic approach to public procurement in order to deliver policy objectives and best value.

3.7 Food procurement in the public health sector

The benefits of the public procurement of healthy food for schools can be equally reaped across the entire population. The emphasis of food procurement policies for public health varies between countries, reflecting their GDP levels. Various objectives such as tackling the increasing obesity resulting from western dietary choices, improving the access to nutritious and safe food, and minimizing health inequalities may be pursued within the same country, region and even locality in contexts of growing income inequalities. Such public health objectives can be pursued through sound public procurement policies; for example, there are many cases of public food policies that help protect workers' health and ensure food safety.

Addressing food waste is a key objective of public procurement policies in many countries, in line with SDG 12 (12.3 and 12.7). An estimated 25 percent of all food purchased by healthcare facilities in the Netherlands is thrown away (Wageningen University and Research, 2016). Strategies to reduce this waste focus on food waste reduction methods in kitchens and the monitoring and reporting of performance according to criteria stipulated in contracts. Wageningen University has developed and applied a practical method to measure food waste and examine its different dimensions, including the quantity and type of food wasted at different steps in the production, to identify which types of products are wasted most (case studies in the Netherlands have focused on vegetables). In 2009, the Irish Environmental Protection Agency, the Cork Institute of Technology and around 40 Irish hospitals jointly launched the Green Healthcare Programme. Under the programme, a system was set up to measure food waste in hospitals in terms of weight and purchase costs (the programme estimated that each kilogram of food wasted costs EUR 2).

Allied to the monitoring of food waste is the requirement within contracts for ongoing training to help improve performance. Food waste can be reduced through simple measures such as the reduction of portions and informed menu choices, as well as training on nutrition and better storage and preparation techniques.

Many countries across the world are experiencing ageing populations. According to the World Health Organization, nearly two billion people across the world are expected to be over 60 years old in 2050, triple the number in 2000. Healthy food experiences for older people in residential care have many similarities with the wider population,

but some individuals may require higher energy and nutrient intakes (for example, Public Health England, 2017). Procurement managers can improve the dietary quality of the food provided by buying foods with reduced salt, saturated fat and free sugar contents and a higher content of fibre, and buy more fruits, vegetables and fish. Such purchasing choices should be made in collaboration with menu planners and catering managers. Procurement managers may also need to ask suppliers for more information to determine which products best help meet any standards identified in the tender.

3.8 Catering

Reducing food loss and waste can generate a triple win: for the economy, for food security and for the environment. Public procurers must decide whether to purchase food or contract catering services. Mixed solutions may also be effective. Typically, for-profit entities provide catering services, and public bodies that purchase catering services, transfer the responsibility of food provision to the caterer. The challenge is that many caterers may not be aware, or may not believe, that there is a solid business case for reducing food loss and waste (Clowes, Mitchell and Hanson, 2018). Therefore, care must be taken to embed the SDG principles into service contracts, not only during the preparation phase of the tender but also during the contract management phase, in monitoring, reporting and performance evaluation.

The way kitchens are organized, or reorganized, needs to be flexible enough to adapt to the introduction of sustainable food practices. This requires an analysis of existing equipment and human resources and of whether adjustments are needed in terms of preparation tasks and management.

A study of pre-consumer waste reduction in catering sites across six countries found that the adoption of sustainable food practices had the following results (Clowes, Mitchell and Hanson, 2018):

- The average benefit-cost ratio for food waste reduction efforts was more than 6:1 over a three-year time frame.
- Within the first year of implementing a food waste reduction programme, 64 percent of sites had recouped their investment. Within two years of implementing a programme, 80 percent of the sites had recouped their investment.

- By reducing food waste, the average site reaped cost savings of more than 5 percent.
- There appears to be no clear correlation between benefit-cost ratios and a site's geography.
- Key strategies to reduce food waste were to measure food waste, engage staff, start small, reduce food overproduction and repurpose excess food.

Certification

Procuring food through integrated environmental farm management systems supports sustainable food production. Labelling and certification can facilitate the promotion of higher environmental production standards through procurement. The Ecolabel Index lists over 150 global and national product-specific voluntary labels, certification schemes and standards. Key concerns are ethical and fair trade practices, animal welfare, marine and terrestrial (e.g. forest and organic) stewardship, and environmental life cycle impacts. Table 1 provides a simplified summary of the areas where assurance schemes and certification can help ensure sustainable public procurement.

Table 1 **Assurance schemes and certification in sustainable public procurement**

THEMES	HEALTH AND WELL-BEING	RESOURCE EFFICIENCY	SOCIO-ECONOMIC CONCERNS
HEALTH	▪ Food safety and hygiene		
SOCIAL WELFARE			▪ Fair and ethical trade ▪ Equality and diversity ▪ Inclusion of small and medium enterprises
ENVIRONMENT	▪ Authenticity and traceability	▪ Authenticity and traceability ▪ Local and seasonal produce	
ANIMAL WELFARE	▪ Authenticity and traceability		

Source: author's elaboration.

The proliferation of labels can, however, result in confusion (e.g. between voluntary labels versus mandatory labels). Obtaining certification can be costly and time-consuming for suppliers; the administrative burdens, costs and delays involved in obtaining Type I ecolabels can result in higher prices and a limited choice of suppliers.[1] The limited space available on packaging may complicate labelling. This can be tackled through innovative technological solutions to provide information (e.g. the scanning of QR and other bar codes). Labelling must be consistent throughout the supply and purchasing phases to enable verification and performance management. Environmental labels that are not self-explanatory for purchasers and consumers must be complemented by other tools (e.g. websites), which add costs that must be considered during the procurement cycle.

In spite of these challenges, certification and labels are a powerful procurement tool that responds to purchasers' needs and expectations. For example, they allow buyers to quickly identify environmentally friendlier food and beverage products (e.g. more sustainably produced palm oil). They also drive improvements in the supply chain and enable actors in that chain to communicate values and show leadership.

Packaging

The global issue of the use of plastic food packaging is linked to food losses in supply chains. Single-use plastic packaging plays an important part in modern life, especially where food safety and hygiene is concerned. Plastic packaging protects food products from contamination and damage and can extend their shelf-life, thus avoiding losses and waste. The plastics industry cites studies that suggest that if plastic packaging didn't exist and other materials were used, the overall use of packaging material and energy, as well as GHG emissions, would increase (Brandt, Pilz and Fehringer, 2011). However, other studies (for example, Schweitzer *et al.*, 2018) suggest that the rise in the use of plastic food packaging is failing to tackle the growing food waste problem (e.g. in Europe) and may in some cases even be fuelling it. Single-use and other problematic types of plastic packaging (e.g. rigid and flexible packaging, sachets, composite packaging and single-use cutlery and tableware)

[1] Type 1 ecolabels are verified by an independent third-party organization and have therefore been recognized as the most reliable certification schemes.

commonly used in public catering services can find their way into land and marine ecosystems if not properly controlled through recycling and waste management practices, both site-based and on-the-go.

Thus, procurers are faced with the double challenge of encouraging sustainable food systems and dealing with packaging and food waste. Systemic approaches are required to avoid unintended consequences when tackling SDG 12 (Sustainable consumption and production), SDG 14 (marine life) and SDG 15 (life on land). Guidance for purchasers is urgently needed; the OPN SPP programme is addressing this need, and bilateral national guidance is emerging, for example in Wales (Waste and Resources Action Programme [WRAP] Cymru, 2019).

3.9 Other sectors: sustainable events

Catering is a major procurement category in the organization of events (from concerts over international trade fairs to the Olympic Games). Public sector involvement in events ranges from licensing to participating, organizing or hosting. These all provide opportunities to improve the sustainability of food systems by linking licensing and purchasing to sustainable food procurement policies and using wider certification and standards (such as the International Organization for Standardization [ISO] ISO 20121:2012 standard for event sustainability management systems).

Building on the London 2012 Food Vision (London Organizing Committee for the Olympic Games and Paralympics Games, 2009), the city of Rio de Janeiro used the Olympics in 2016 to establish the Rio Sustainable Eating Initiative (Rio Organizing Committee for the Olympic Games and Paralympics Games, 2016). Created jointly by the government, civil society organizations and research institutes, this initiative supported the Rio Organizing Committee in the creation of a procurement plan for the supply of healthy and sustainable food for the Games. The food strategy for the Tokyo 2020 Games contains provisions regarding food waste, the reuse of tableware, specifications for healthy and safe foodstuffs, and cultural and dietary diversity (Tokyo Organizing Committee for the Olympic Games and Paralympics Games, 2019).

Key recurring themes in public food procurement for events are the facilitation of access to healthy and sustainable food for everyone (in food procurement and

throughout the supply chain), the purchasing of food from ethical (e.g. marine and land stewardship), diversified and safe sources, and socially responsible procurement that addresses gender issues and improves skills and training. Where licensing is required for third party events, criteria for food waste reduction and links to local food procurement strategies should be used as mandatory conditions within the application and approval system.

3.10 Conclusions

Public procurement can, and does, act as a significant driver for more sustainable and socially responsible production and consumption. Food procurement may bring about health and well-being benefits, alongside environmental protection. Food procurement policies and practices typically concentrate on production. Consumption is often indirectly addressed through nutritional requirements, provisions that aim to improve health and well-being, and efforts to reduce waste. The adoption of a more integrated approach to the procurement of food and beverages – covering sourcing, consumption and waste management - would provide a more effective contribution to sustainable food systems and wider SDGs, beyond SDG 12.3 *Food waste reduction*.

The principles for an integrated approach to the promotion of sustainable food systems through public food procurement can be synthesized into eight key areas (European Committee of the Regions, 2018):

- **Policy commitment** – the introduction of sustainable food in public catering is a medium- to long-term process. A long-term vision and continuity are therefore important. Aligning food procurement with policy goals (linked to SDGs) related to health education, the reduction of carbon emissions and supporting local economies is also recommendable.
- **Supply (e.g. supply chain capacity)** – to meet the demand for sustainable procurement, procurers should understand food supply chains' capacity and maturity in terms of production (type of products and volumes, including organic produce), processing (type of processing available) and packaging (packaging sizes available) and distribution (e.g. wholesalers) and transport. A good balance between demand and local supply increases the opportunities for small suppliers (producers and processors) to get involved in the food procurement procedure.

- **Purchasing food or catering services** – where a choice exists, a decision needs to be made on whether to purchase food or catering services. Mixed solutions may also be effective. If procurers purchase food, they have a direct relationship with suppliers. If they purchase catering services, the provision of food falls under the responsibility of the caterer.
- **Market engagement** – procurers should set up a viable system of demand and supply by communicating sustainable food ambitions and assessing the market's capabilities to meet those ambitions now and in the future.
- **Food procurement procedures** – these procedures are dependent on the type of purchasing (e.g. of food or of outsourced catering services) and the estimated value of the procurement. Centralized purchasing strengthens the negotiating power of public procurers but entails larger contract values, which may cut small suppliers out of the competition.
- **Tendering process** – the procurement of food or catering services is driven by cost considerations. An open procedure to award contracts to the most economically advantageous tender makes it possible to achieve a balance between price (cost) and a range of other criteria such as quality, technical merit, aesthetic and functional characteristics, accessibility, social characteristics, environmental characteristics, innovative characteristics, after-sales service and technical assistance, and delivery conditions (European Commission, 2015).
- **Demand (e.g. menu planning)** – by linking nutrition, dietary choices and portion sizing, food purchasing may encourage sustainable consumption patterns and bring social (improved health and well-being, the promotion of ethical production), environmental (reduced carbon emissions and waste) and economic (the development of local SMEs and job creation) benefits.
- **Waste** – reducing avoidable food waste is a key target of SDG 12. Where food waste arises, it is imperative that separate collection systems are implemented to avoid cross-contamination of waste streams and enable organic and nutrient loops to be closed through recycling and composting where appropriate. Returning nitrogen (N), phosphorus (P) and potassium (K) back into agricultural production systems not only reclaims critical raw materials but also reduces dependency on virgin nutrient stocks and artificial fertilizers.

Adopting a more integrated, circular approach using these principles enables the realization of economic benefits that act as a driver for shifting behaviours towards more sustainable procurement practices, even in countries where the delivery of SDGs

is more challenging. Goals such as economic growth are sometimes seen as more important, or even inconsistent with, social and environmental goals. Implanting circular economy principles within food systems can help rebalance this equation and ensure that food-related social and environmental goals are delivered as part of a green growth public procurement policy.

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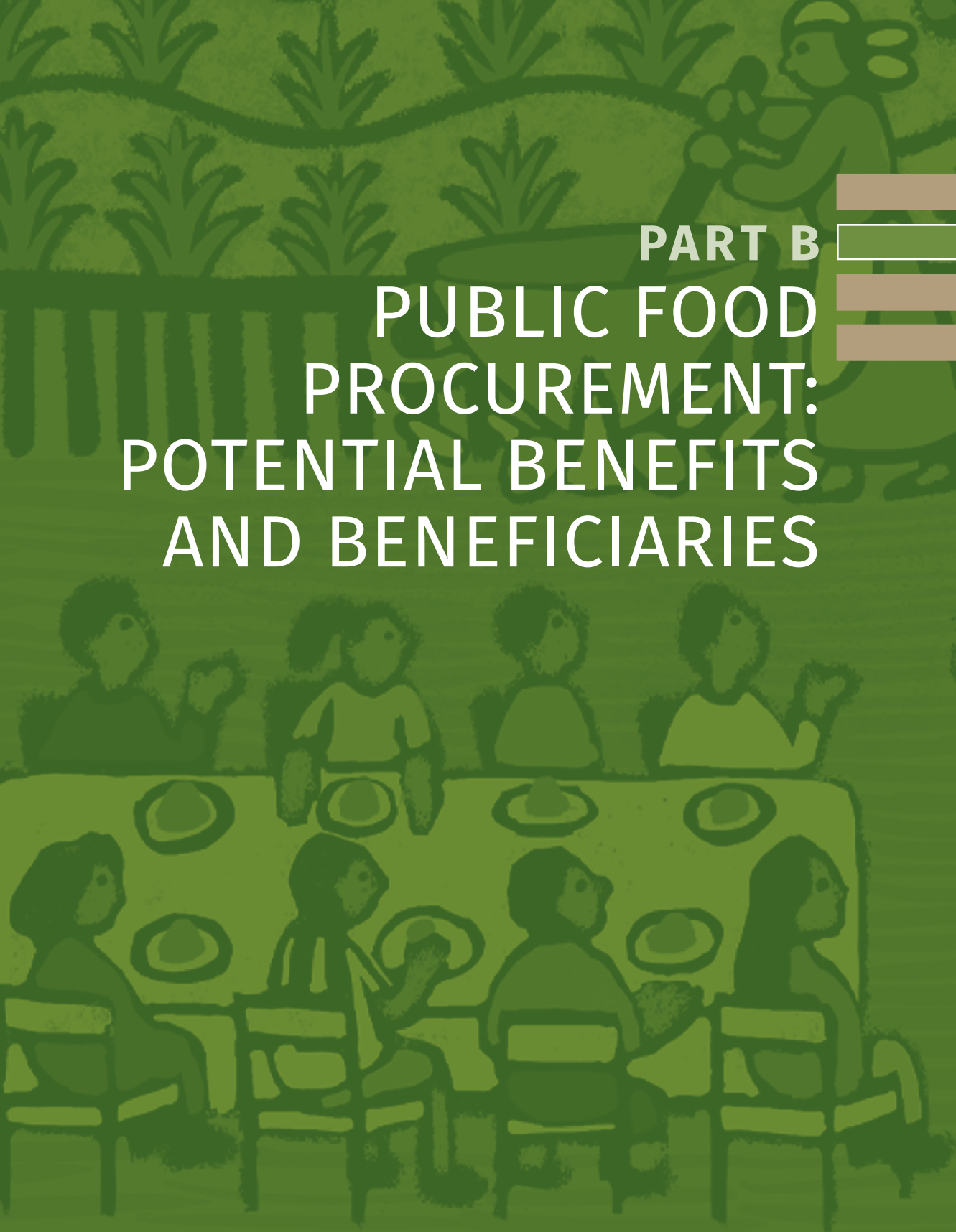

PART B
PUBLIC FOOD PROCUREMENT: POTENTIAL BENEFITS AND BENEFICIARIES

4 SCHOOL FOOD PROCUREMENT AND MAKING THE LINKS BETWEEN AGRICULTURE, HEALTH AND NUTRITION

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ABSTRACT

Public school food procurement has the potential to stimulate agricultural productivity and improve food security by creating an accessible market for smallholder farmers. This chapter presents a high-level multisectoral framework for school feeding to illustrate how school food procurement can be leveraged to broaden the benefits of school feeding programmes beyond child health and education to include agricultural and community development. Using real world examples mapped to a stylized supply chain framework, the analysis captures a number of common features of public procurement systems for school food (also known as "home-grown school feeding") and highlights context-specific nuances of different implementation models. The chapter suggests that as the evidence on the effects on agriculture and community development of school feeding programmes is still largely limited to case studies, rigorous research into the costs, benefits and trade-offs of different models of school food public procurement is needed.

4.1 Introduction

School feeding, or the provision of school meals, is a multisectoral intervention that is widely implemented by governments worldwide. School feeding programmes reach about 368 million children globally, for a total investment of about USD 70 billion annually (World Food Programme [WFP], 2013). Rigorous studies have

shown that school feeding can improve children's schooling, as well as their physical and psychosocial health, with most benefits being accrued by more disadvantaged children (Kristjansson *et al.*, 2007). Meanwhile , experiences in high- and middle-income countries (including over half a century of programming in the United States of America and more recent experiences in large-scale programmes in Brazil and India) shows that food procurement for school meals has been used as an outlet for commercial farmers to market their surplus (Levine, 2008; Schneider *et al.*, 2016; Drake *et al.*, 2016) (see also Chapters 2 and 23 on the United States of America, Chapter 31 on India and Chapters 2, 8, 9, 10, 11, 12, 14, 15 and 16 on Brazil). These are examples of the use of public procurement as a policy tool to pursue economic, social and environmental goals. On average, public procurement spending accounts for 13 percent of countries' total gross domestic product (GDP), with virtually no differences between country income level groups (Bosio and Djankov, 2020).

The public sector demand for food is significant; and can therefore provide an important market for smallholders, who constitute the majority of the workforce in rural areas in developing countries and rely on agriculture for their livelihoods. Public food procurement encompasses food procured for food assistance programmes, schools, prisons, hospitals, etc. This chapter focuses specifically on the procurement of food for school feeding as a case study that can be applied also to other types of public food procurement. Over the past two decades, national governments in low- and middle-income countries and international agencies have shown interest in the potential for explicitly linking agricultural development with the market for school feeding, through what has become known as "home-grown" school feeding (HGSF) approaches (Espejo and Galliano, 2009; WFP, 2013). In HGSF, the demand for food and services from school feeding is channelled to smallholders and other supply chain actors with the explicit intent of stimulating agricultural productivity, increasing incomes and reducing food insecurity. The seemingly simple idea behind this framing is to create a win-win situation for schoolchildren and commercial farmers (Sumberg and Sabates-Wheeler, 2011). As school feeding programmes require a regular supply of food throughout the year, they can provide a predictable demand for food of a known quantity, quality and price.

In practice, the pathways linking investments in school feeding to welfare impacts in smallholder farmers are complex, including both direct and indirect effects. Moreover,

as supply and value chains for school meals operate in multiple, context-specific configurations, the effects on chain actors, including producers, caterers and other processors, depend on a range of design and implementation characteristics that are not yet fully understood (Gelli *et al.*, 2012). There is little rigorous empirical evidence of the effects on the participation of smallholders in the market of school feeding programmes (Bundy *et al.*, 2009; Sumberg and Sabates-Wheeler, 2011).

This chapter introduces a high-level multisectoral framework for school feeding to illustrate how school food procurement can be leveraged to broaden the benefits of programmes that already span social protection, nutrition and education, to also include agriculture and community development. The chapter begins with an overview of the general programme theory for school feeding as a multisectoral strategy with objectives related to social protection, education, health, nutrition and agriculture. This is followed by the application of the programme theory to schematic design and implementation configurations based on three examples of implementation in the real world. A following section discusses the main implications and potential trade-offs between the different objectives of school food procurement and highlights research gaps. The last section contains concluding remarks.

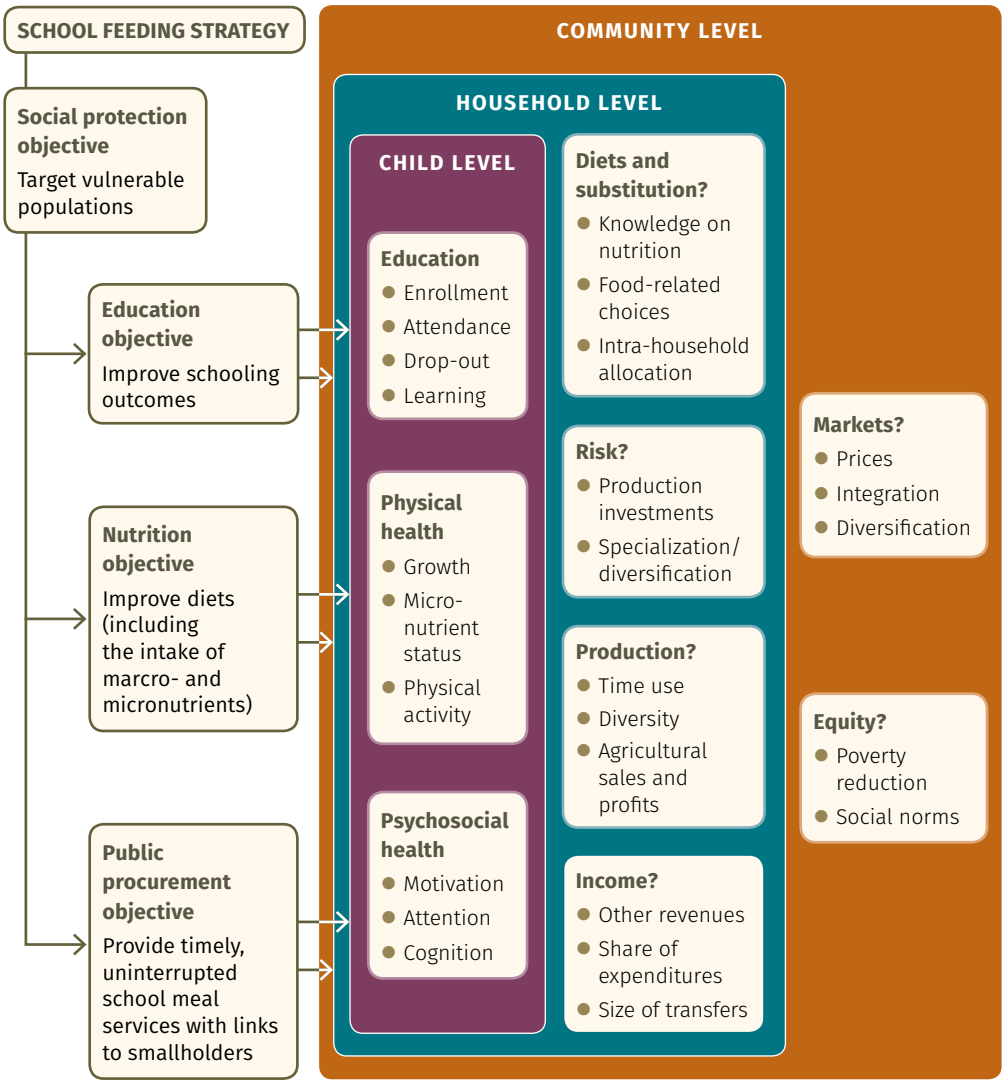
4.2 School feeding as a multisectoral strategy

4.2.1 Framing school feeding programmes as multisectoral strategies

Recent reviews suggest a framing of school feeding programmes as multisectoral strategies with goals across social protection, education, health and nutrition, and potentially agriculture and other social development domains (Alderman and Bundy, 2011; Drake *et al.*, 2017; Watkins *et al.*, 2017). Figure 1 presents, in very broad terms, a simplified ecological framework linking the objectives across the different sectors to child, household and community-level effects of school feeding. The evidence of the effects at the level of children is fairly well established and underpins the three main objectives related to social protection, education and nutrition. These effects depend on a range of household level behaviours and are also mediated by community-level factors. The underlying public procurement objective provides the

entry point targeting household and community level agriculture, thus providing a potential bridge linking effects across the domains of education, nutrition, health and agriculture, as described in the following sections.

Figure 1 **Stylized ecological framework of school feeding as a multisectoral strategy including potential effects at the levels of children, households and communities**



Source: authors' elaboration.

4.2.2 Effects of school feeding on education, diets, health and nutrition at the level of children

Rigorous evidence suggests that school feeding can affect children's education by increasing school participation (enrolment, attendance) and learning. It can also affect children's physical and psychosocial health by providing key foods and nutrients to complement diets. Improving physical and psychosocial health is also likely to improve schooling outcomes. The evidence base for the effects on education and nutrition of school feeding is largely well established and highlights that most of these benefits accrue to more disadvantaged children (Kristjansson *et al*., 2015; Bundy *et al*., 2009). This particular feature of the redistributive effects of school feeding interventions can be highlighted by framing the social protection objective at a higher level than the education, health and nutrition, and agriculture goals (Alderman and Bundy, 2011).

The quantity, quality and diversity of the food consumed by children plays a major role in determining their nutritional status, and provides the most direct link between school feeding, diets, health and nutrition outcomes. School feeding programmes are designed to supplement the food provided at home and improve schoolchildren's net food intake by providing energy, micronutrients and macronutrients. School food can, in principle, be shared by children with other household members or can substitute (at least partly) for food normally consumed in the home. This is obvious, and in most cases planned, for take-home-ration interventions, where children take home a quantity of food on a regular basis, some of which is consumed by other family members or sold. This also applies to any school feeding programme, because households may in principle use the school meal as a substitute for food normally consumed at home and spend the monetary equivalent otherwise. If the children receiving school meals are malnourished, substitution within the household may reduce the health and nutrition benefits of those meals.

However, evidence generally indicates that most of the calories provided by school feeding programmes "stick" with their beneficiaries (Jacoby, 2002). Interestingly, however, evaluations of fortified biscuits in Bangladesh and Indonesia found that gains in nutritional intake were not limited to the children actually receiving the biscuits at school (Ahmed, 2004). The two studies found significant evidence that schoolchildren shared the biscuits with younger siblings at home. Recent randomized controlled trials

in Burkina Faso also found that take-home ration programmes led to the improved nutritional status of younger siblings in beneficiary households (Kazianga, de Walque and Alderman, 2014). These studies provide emerging evidence of a spillover effect and a window of opportunity that can be planned for to affect children during a critical development stage, when nutritional interventions have the strongest impact.

The effects of school feeding at the level of children depend on a series of decisions taken at the level of households, such as the substitution of normally consumed foods (which affects both children's overall diets and the potential additional demand for food on the market). These decisions may be influenced by complementary interventions, including nutrition education or behaviour change communication (BCC) to address knowledge gaps related to nutrition and health, for example. A recent example involving the use of school meals as platforms for diet-related BCC was rigorously tested in community-based preschools in Malawi. A cluster randomized controlled trial entitled Nutrition Embedded Evaluation Programme – Impact Evaluation (Gelli *et al.*, 2017) found that meals provided in community-owned preschool centres for early childhood development in Malawi were an effective platform for BCC to boost the diversity of food production and improve maternal knowledge and nutrition practices at the household level, and thereby improve the diets of preschool children and promote the linear growth of their younger siblings (Gelli *et al.*, 2018). The study highlights the potential of preschool meals as platforms to promote behaviour change at the levels of households and broader communities; whether this is also an effective strategy in primary schools remains an important question for further research.

4.2.3 Smallholder agriculture

In addition to pursuing objectives at the level of children, public procurement activities may aim to influence decisions at the level of households, including decisions relating to agricultural investments, production and marketing (Masset and Gelli, 2013). Unlike for education, health and nutrition effects, the evidence base for effects on agriculture-related changes is very thin, and links between school feeding and these decisions are to be considered aspirational. Based on the theoretical model presented in Masset and Gelli (2013), the potential impact of school feeding on smallholders depends first on the extent to which the demand for school food is additional on the market.

The size of the shift in demand depends on the extent of household substitution effects described in Section 2.2., as well as on the size of the market involved. One extreme case is that of full substitution, whereby school food entirely substitutes for food normally consumed at home. In this case, there is no increase in demand, and school feeding does not affect production volumes or prices. Nevertheless, the intervention may have a distributional effect, if the food is purchased from smallholders rather than from large farmers; in this case, smallholders' revenues increase, while those of large farmers decrease.

Full substitution is, however, unlikely to occur and the largest substitution is likely to arise when households interpret school food as a cash transfer (Jacoby, 2002). In this theoretical case, the income equivalent of the transfer is spent in accordance with income elasticities. Evidence shows that households rarely interpret food transfers as cash transfers and that recipient households tend to attach some preference to the food received and thus consume food beyond what the income elasticities would suggest. Actual shifts in demand are thus likely to be situated somewhere in between these extremes.

The impacts of school feeding interventions on agricultural output and prices depend on the slopes of the demand and supply functions, or demand and supply elasticities (Caldes, 2004; Masset and Gelli, 2013). Supply elasticity depends on three main factors, including crop yield risk, market failures and the rigidity of fixed factors. If farmers are unable to meet the additional demand for food (i.e. supply elasticity is low), most of the effect of the intervention will take the form of a rise in prices, with little impact on output. From a welfare perspective, producer surplus increases (farmers win), while consumer surplus may decrease (consumers may lose). Meanwhile, if farmers are able to meet the additional demand for food by using existing inputs in a more productive manner or by using more inputs (i.e. supply elasticity is high), then the intervention would have a large impact on output and a negligible impact on prices. From a welfare perspective, both producer surplus and consumer surplus increase (both farmers and consumers win). Therefore, for school feeding programmes to benefit both producers and consumers, high supply elasticity is required. The distributional effects of such programmes also depend on the type of farmers (e.g. large or small) who are able to respond to the demand for school food.

In practice, school food interventions are likely to impact both prices and output. The impact on prices depends on the size of the market and the level of market integration. In principle, if markets are efficient, prices for the same food item should be the same across locations (after adjustment for transport costs). However, the literature on market integration suggests that transport costs may create a wedge between prices at different locations, which would allow prices in different locations to vary in an uncorrelated way within a band. Indeed, if transport costs for an isolated area are very high, food prices in that area may increase up to a point where they make transport worthwhile, in other words where prices are equalized. The impact of a price rise resulting from a school feeding intervention on consumers is more ambiguous.

Depending on the extent of the increase in prices, some households may see their welfare reduced as a result of the intervention. The programme may also have a distributional impact if it shifts demand from large to small farmers. In addition, the programme may potentially reduce household risk by offering a reliable demand and stable prices, thus stabilizing small farmers' incomes. Risk reduction has a number of positive effects, including increasing expected utility, reducing the use of inefficient coping strategies (such as the use of low-yielding crops and precautionary saving) and encouraging productive investment. However, yield risk may well dominate price risk. In addition, it may take a long time before price effects change farmers' expectations. The impact of school food programmes on risk-related behaviour is therefore unlikely to be large. In addition to the effects on producers and consumers, school feeding programmes may have wider effects on the local economy by generating employment. This is described in some of the case studies presented in Section 3.

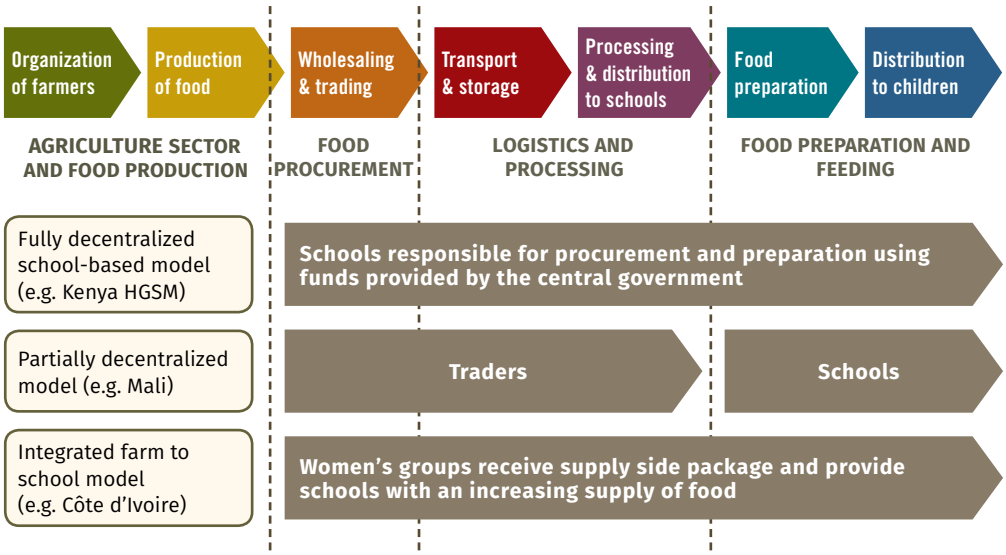
Finally, school feeding programmes may be used to direct farmers' production decisions towards the use of highly nutritional and/or climate-resistant crops, which potentially boosts the diversity of food production. For instance, the introduction of neglected or underutilized species (e.g. cocoyam, orange-fleshed sweet potato, teff or pigeon peas) in school menus could shift production decisions towards these crops, which are highly nutritious and more climate-resistant than the crops traditionally consumed and grown by smallholders for school food procurement in developing countries. In addition, this strategy has the potential to improve the diversity of the diets of farming households given the documented linkages between farm production diversity and farm household dietary diversity (Sibhatu, Krishna and Qaim, 2015).

4.3 School feeding implementation models[1]

4.3.1 Supply chain models for school feeding

The ability of school feeding programmes to deliver the effects depicted in Figure 1 critically depends on appropriate programme design and implementation. Programmes often face challenges related to financing, the flow of information, supervision, monitoring, quality assurance and the lack of trust between schools and farmers. In practice, school feeding programmes exhibit different, context-specific implementation models or configurations. Different approaches may even coexist within the same country, if, for example, implementation is managed by decentralized institutions (e.g. states in Brazil or India), or where agencies such as WFP complement national programmes (e.g. in Mali and Kenya). Figure 2 shows a set of stylized supply chain models for school feeding that link food production to food distribution in schools.

Figure 2 **Stylized supply chain models for school feeding programmes**



Source: authors' elaboration.

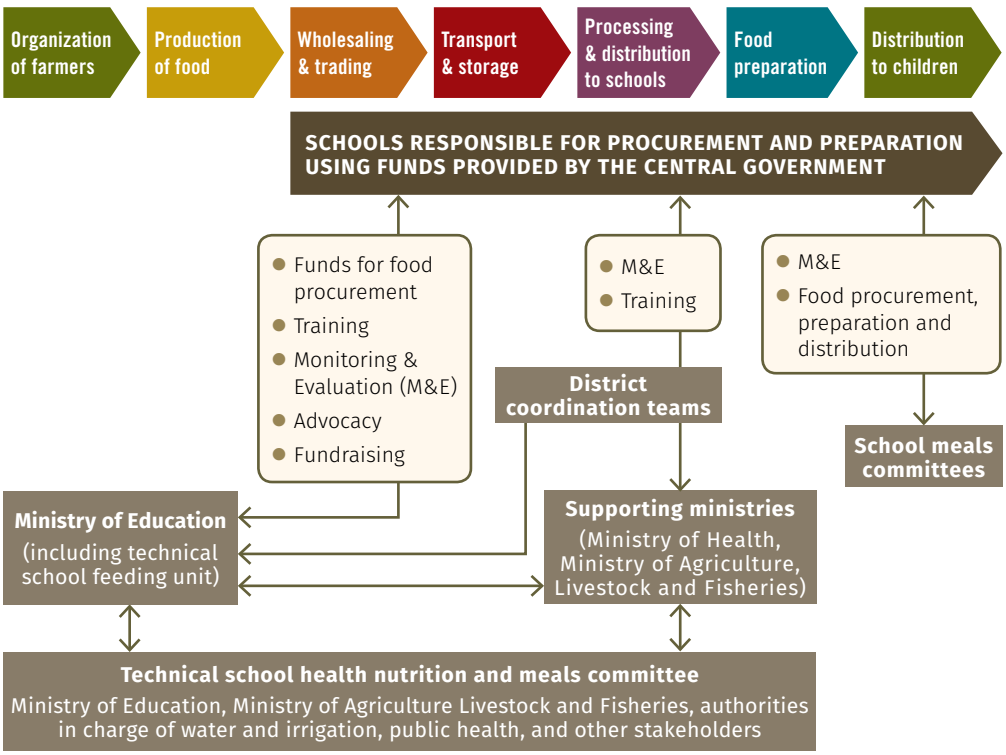
[1] This section builds on Gelli *et al.*, 2012.

Sections 3.2, 3.3 and 3.4 explore some of the different design and implementation features of these models and the trade-offs that may arise in practice. The sections present three stylized examples of implementation models that are commonly implemented at scale across the world. The case studies describe programme activities at each step of the supply chains.

4.3.2 Fully decentralized model

In this model, based on the Home-Grown School Meal (HGSM) programme in Kenya, food procurement is undertaken at the school level and coordinated by the members of school meals committees (SMCs), including teachers and community members (see Figure 3) (see Chapter 33 for additional analysis of the Kenyan experience).

Figure 3 **Stylised fully decentralized model scenario of school feeding as implemented in Kenya**



Source: authors' elaboration.

In the case of the HGSM programme in Kenya, the food procurement process replicates the process used for the procurement of educational material: cash is transferred directly from the national Ministry of Education to school accounts using existing school-based management systems on a biannual basis. Schools are informed about how much money is credited into their accounts for school food; the procurement of the food is then coordinated by the SMCs through competitive bidding by registered/licensed local farmers or suppliers. Preference is given to suppliers belonging to vulnerable groups such as HIV-positive individuals or women (e.g. widows) – although it is not clear how this preference is implemented. Procurement is guided by circulars from the National Treasury (the Kenyan ministry of finance). The frequency of procurement is influenced by the availability of storage facilities and of food. The construction of storage facilities is considered the responsibility of parents and the wider community.

Programme activities along the schematic supply chain under full decentralization include:

Organization of farmers

- No activities aimed at organizing farmers.

Production capacity

- No activities aimed at increasing farmers' production capacity.

Wholesaling and trading

- Commodity prices used for budgeting purposes are set on the basis of government guidelines, price surveys and gross margins for produce as set by agricultural experts.
- Suppliers must have a trading license, a bank account, a registration certificate, three years of trading experience and permanent premises.
- Procurement follows a simple tendering system: publication of the commodity description and supply criteria, submission of tenders, purchase and payment by cheque.
- Procurement mainly concerns maize, common beans, pigeon peas, green grams, soybeans and rice.

- Purchase lists are defined by SMCs, whose members visit local markets to collect product samples.
- The activities of SMCs are guided by manuals of the Ministry of Education.
- The procurement process replicates the procurement process for educational material.
- Managing the funds in the dedicated bank account for school feeding requires three signatures.
- Procurement occurs immediately after schools receive the funds.
- Procurement is undertaken at the level of individual schools by SMCs.

Transport and storage

- Successful suppliers are responsible for the delivery of commodities to schools; no additional costs are charged for transport and delivery.
- Storage facilities in schools are assumed to be of adequate quality to store a three-month supply of food.

Processing and distribution to schools

- The quality of the food is inspected upon its arrival in schools, in the presence of the supplier. Receipts are also exchanged at this point.

Food preparation

- In the Kenyan case, many schools were previously supported by international school feeding programmes, and in theory have storage facilities and kitchens that meet the relevant standards.
- Cooks are hired or provided on a voluntary basis by the community.

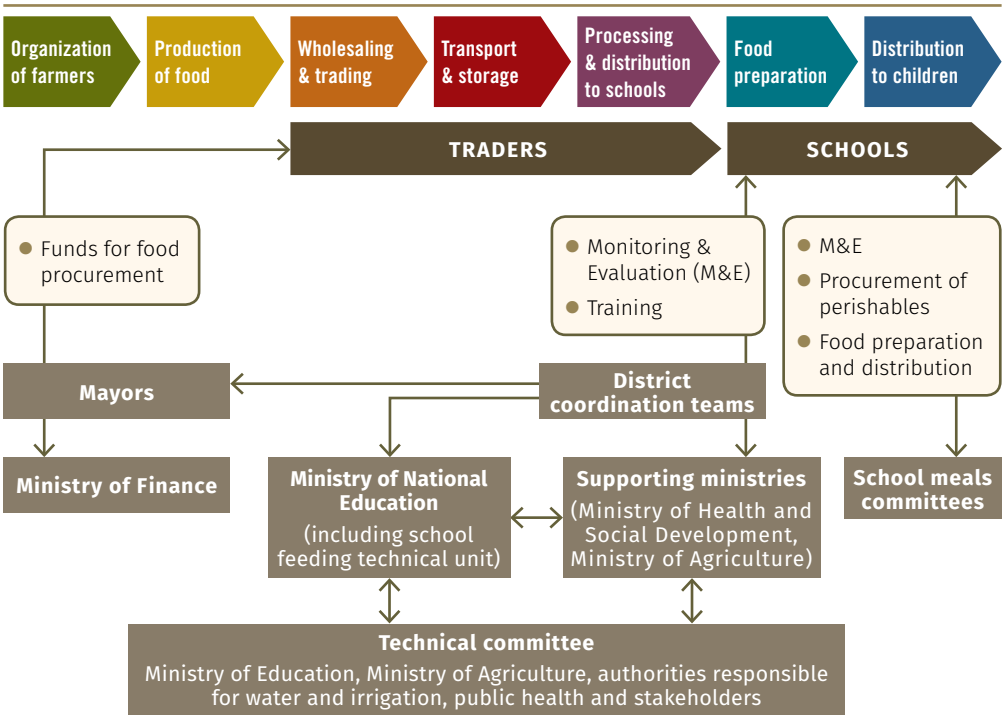
Distribution to children

- Children receive either a meal at midday or a mid-morning snack of porridge.

4.3.3 Partial decentralization

An example of this model is the national HGSF programme in Mali, where children receive lunch at school at noon. The food consists mainly of staples, alongside some vegetables and fruits. School enrolment figures are collected by district education officers through SMCs and passed to mayors with estimates of food requirements. The SMCs operate at the level of villages and are responsible for the day-to-day management of the programme. They are subdivided into subcommittees and include a stock manager, a representative of the cooks and a treasurer. Mayors, who receive a budget from the Ministry of the Economy and Finance based on food requirements, issue tenders and provide credit advances to certified providers (traders) to procure staple foods (cereals and legumes). The providers purchase the staple foods in markets or from smallholders and deliver it to the schools. Perishables are purchased by SMCs at the village level on a weekly basis or donated by communities.

Figure 4 **Stylized partially decentralized model scenario of school feeding as implemented in Mali**



Source: authors' elaboration.

Programme activities along the stylized supply chain under partial decentralization include:

Organization of farmers

- No activities aimed at organizing farmers.

Production capacity

- No activities aimed at increasing farmers' production capacity.

Wholesaling and trading

- Commodity prices used for budgeting purposes are set as an average of prices for selected regions and aligned with figures provided by the National Cereals and Produce Board.
- Cash is transferred from the Ministry of Finance to mayors biannually, based on the number of children; procurement is expected to be undertaken when prices are at their lowest.
- Suppliers (traders) must be certified service providers.
- Procurement follows a simple tendering system: publication of the commodity description and supply criteria, submission of tenders, purchase and payment via credit advance.
- Procurement mainly concerns maize, millet and beans.
- Food quantities for tenders are established annually by mayors and district education officials based on school enrolment figures.
- Purchasing prices are determined based on government guidelines.

Transport and storage

- Successful suppliers are responsible for the delivery of commodities to schools; no additional costs are charged for transport and delivery.
- Storage facilities in schools are assumed to be sufficient to store a three-month supply of food.

Processing and distribution to schools

- The quality of the food is inspected upon its arrival in schools, in the presence of the supplier.

Food preparation

- Many schools were previously supported by international school feeding programmes, and in theory have storage facilities and kitchens that meet the relevant standards.
- Cooks are hired or provided on a voluntary basis by the community.

Distribution to children

- Children receive a meal at midday.

4.3.4 Integrated farm-to-school model

An example of the integrated farm-to-school model is the HGSF programme in Côte d'Ivoire, where women's groups are mobilized to support the supply of foods through the school feeding programme. The women's groups are supported by the Government (through the *Direction nationale des cantines scolaires* [DNCS] or national directorate for school feeding) based on five-year cycles including capacity-building activities that aim to increase agricultural production. Women's groups supply increasing quantities of food for school feeding in targeted communities, beginning with 25 percent of cereal requirements in the first year, which gradually increases to 100 percent by year four. Any excess production beyond these requirements is sold on the market or to the suppliers of the national school feeding programme at a fixed price established by a central government board.

Programme activities along the stylized supply chain in farm-to-school models include:

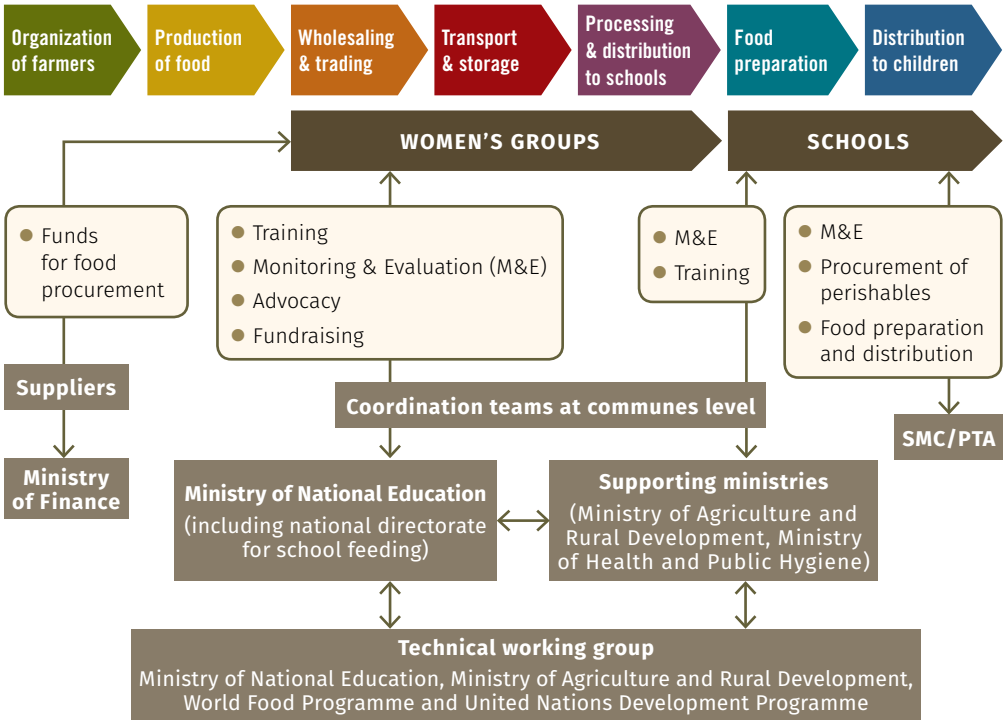
Organization of farmers

- Particular focus is given to how smallholder farmers will be organized around a school. The DNCS directly works with women's groups, from sensibilization to the creation of women's groups as legal entities.

Production capacity

- Particular focus is given to how farmers' production capacity will be increased. The DNCS works in close collaboration with the national agency providing support to rural development to ensure that women's groups' production capacity is enhanced. The women's groups receive technical agricultural support and training,

Figure 5 **Stylized integrated farm-to-school model of school feeding: Côte d'Ivoire**



Source: authors' elaboration.

with the objective of meeting an increasing portion of school food requirements: 25 percent in year 1, 50 percent in year 2, 75 percent in year 3 and 100 percent in year 4 and beyond. The women's groups will sell their surplus production on free markets or to the suppliers of the school food programme. The DNCS is committed to purchasing any remaining produce from women's groups at a fixed price, so that price fluctuations on the free market do not affect these groups.

Wholesaling and trading

- Food quantity requirements are estimated on an annual basis by SMCs and education officers operating at the level of communities, based on school enrolment figures.
- Women's groups supply food directly to the schools, in the communes where these groups are fully functional. Any remaining school food needs are met by the DNCS.

- Food prices are set by a central market board, a national market regulation entity following governmental guidelines.
- By law suppliers (traders) for remaining commodity needs must be certified service providers.
- The DNCS works directly with traders throughout the procurement process; subsequent purchase and direct payment is conducted by the Ministry of the Economy and Finances.

Transport and storage

- The women's groups are responsible for the delivery of food to the schools.
- For food purchased by DNCS from other suppliers, transport service providers are contracted at the national level; they are responsible for delivering food to the schools.
- Storage facilities at schools are generally of adequate quality and size to store a three-month supply of food. Storage facilities are also set up by women's groups to store their excess production in the vicinity of schools.

Processing and distribution to schools

- The quality of the food is inspected upon its arrival at schools.

Food preparation

- In theory, many schools have storage facilities and kitchens that meet the relevant standards.
- The nutrition unit under the DNCS is responsible for the issuing of standards for the nutritional value of the meals provided in schools. The DNCS provides the SMCs with nutritional guidelines and tools that emphasize the importance of good nutrition, promote the consumption of local foods that are rich in micronutrients, and take into account dietary cultures and practices.
- Cooks are provided on a voluntary and rotational basis by the community.

Distribution to children

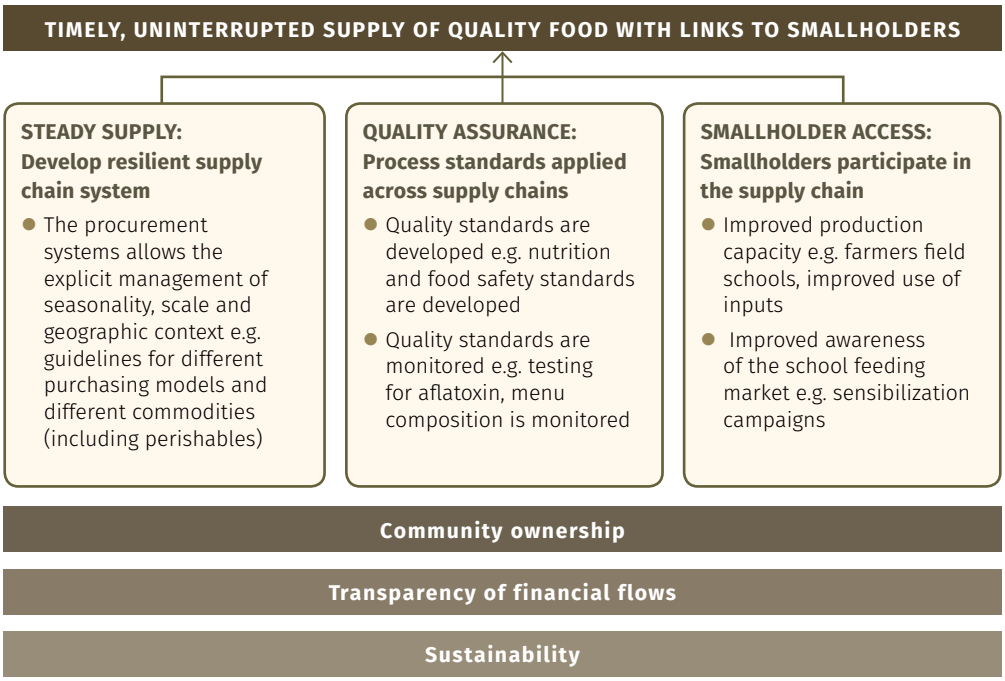
- Children receive a meal at midday.

4.4 Discussion

4.4.1 School food procurement and attaining the multiple objectives of school feeding

Attaining the potential multiple benefits of school feeding programmes (see Figure 1) depends to a large degree on the specifics of the school feeding service delivery, including the details of the design and implementation of the food procurement. Regardless of the specific implementation model, the overarching goal of any food procurement system for school food is to ensure the timely and stable supply of quality food (see Figure 6). This is a process-oriented goal that generally encompasses two dimensions: ensuring a steady supply of adequate food and providing quality assurance at each step of the supply chain. A specific policy goal may introduce a third dimension: links with smallholder farmers. In practice, this third dimension is not always included explicitly.

Figure 6 **Schematic example of stylized procurement objectives for school feeding programmes**



The first objective, i.e. ensuring a steady supply, refers to the development of a resilient supply chain system for the provision of the different foods required for the school food service, allowing for the explicit management of scale, seasonality, and the geographic and cultural context. This dimension is linked to the financing of the school feeding programme and is generally driven by cost considerations.

The objective of quality assurance is to provide process standards that underpin quality assurance processes in the food supply chains involved, including developing and applying nutrition and food safety standards to monitor the food service delivery. These are support-related processes that are not always financed by the same budget as food procurement; as such, they may be overlooked during the budgeting process.

Finally, the additional objective of smallholder access may be included if there is a policy goal to strengthen the participation of smallholders in the supply chain for school food. This would include linking with a) activities that improve production and post-harvest capacities and b) additional activities including information campaigns to increase the awareness of the market opportunity from the school food market and strengthen relationships between schools or other institutions in charge of procurement and farmers (e.g. through the development of contracts).

Additional objectives cutting across various dimensions may be added to support the overall procurement goal of the uninterrupted delivery of safe food, including for example:

- community ownership and participation in the management of the programme;
- transparency of financial flows at all levels; and
- sustainability of the programme.

4.4.2 Food procurement and smallholder participation across different implementation models

Exploring the opportunities and trade-offs of different procurement models and their links to smallholders remains an important challenge for policymakers. Indeed, evidence on the costs and benefits of different models or their implications in terms of food types (staple foods, perishables), prices, timeliness, seasonality and scale, is

scarce. Existing comparisons of models therefore focus on design features and are largely descriptive.

Examples of the specific objectives and activities related to food procurement across the three case-study implementation models are summarized in Table 1. Across the three models, a common set of capacity-strengthening activities are required to increase pro-smallholder engagement, including supply-side interventions focusing on farmer organizations or activities related to quality assurance to improve the cost-efficiency of the procurement process. An additional common need across models is the creation of mechanisms to improve the flow of information and coordination between actors (which requires the mapping of supply and demand actors).

4.5 Conclusions

This chapter describes the elements of a high-level multisectoral strategy for school feeding to illustrate the potential links between objectives related to social protection, education, health and nutrition on the one hand and agriculture on the other. While the existing evidence about the impacts of school feeding in terms of social protection, education, nutrition and health is relatively well-established, there remain important gaps in the evidence regarding the potential of school food procurement to promote agricultural and community development. An overview of a potential agenda for research on these issues concludes this chapter.

Improving programme design

School feeding programmes that aim to achieve objectives related to education, health and nutrition, agriculture and social protection must manage any potential trade-offs between these objectives. As such, it is critical that objectives are clearly defined (including differentiation between primary and secondary objectives) and the programme theory linking the different target groups, the programme activities and the impact pathways is clearly articulated. Clarifying the objectives is also critical in terms of defining programme activities within the context of an impact evaluation, and in particular for the identification of appropriate control groups (see also Chapter 21 on impact evaluations of HGSF programmes).

Table 1 **Examples of potential objectives and activities for school food procurement**

FULL DECENTRALIZATION		PARTIAL DECENTRALIZATION		INTEGRATED FARM-TO-SCHOOL MODEL	
GOALS AND OBJECTIVES	PROGRAMME FEATURES AND ACTIVITIES	GOALS AND OBJECTIVES	PROGRAMME FEATURES AND ACTIVITIES	GOALS AND OBJECTIVES	PROGRAMME FEATURES AND ACTIVITIES
Ensure that food is nutritious and of high quality. Smallholder farmers are able to meet the demand from school feeding programmes. The procurement model allows for stability and a frequency of procurement. The procurement system allows for the direct purchasing from farmers in a sustainable way, whereby both children's and farmers' interests are optimally served.	Procurement frequency is assured. Delivery schedules are flexible. The capacities of smallholder farmers to comply with the requirements of the procurement system are reinforced. Farmers receive assistance to form associations. Link with partners to support farmers build their capacity. Information is made widely available to farmers. Community members are the target of sensibilization campaigns. Procurement officers are sensitized to become more pro-smallholder (including SMCs)	Timely delivery of safe/ high quality foods, cost-effectiveness. The feasibility of procuring food from smallholder farmers is improved by mayors (directly or indirectly). Strengthen the capacities of farmer organizations by providing information, improving storage capacities, providing credit, etc. Increase the procurement of perishables in support of smallholder farmers and children's nutrition.	Source a higher proportion of procurement from farmer organizations (via traders or directly). Provide more information to stakeholders in the supply chain. Increase funding to schools for the procurement of perishables. Map supply-side interventions in the area and take steps to link them to the programme. Review procurement procedures and make them more appropriate to smallholder farmers and farmer organizations (e.g. securities, documents, registrations, etc.). Review the timing of procurement in light of storage capacities, seasonality, etc.	Women's groups supply food to schools. Shorten storage periods for school food. Minimize transaction costs (most food comes from the farm gate to the school).	Purchase produce at a fixed price. Women are free to sell excess production on markets. Quantities supplied to schools by women are flexible. Capacity building – community and women empowerment. Provide agricultural support.

School food procurement

Regardless of the food procurement model, the primary objective of school food procurement is the timely and stable supply of quality food for school feeding. Efforts to help smallholder farmers respond to the demand from the school feeding market are framed under the objective of ensuring a safe and stable supply. Further research is needed to explore the trade-offs within different pro-smallholder procurement models, analysing data relating to their costs and impacts, including in terms of market integration, scale, timeliness, prices, food types (including perishables) and seasonality.

The issue of decentralization highlights the inherent tension between procurement processes' priorities of transparency, accountability and value for money on the one hand, and the agricultural objective to prioritize procurement from smallholders on the other. These competing but not incompatible priorities require careful balancing to ensure stakeholders' buy-in into the programme and reap the intended financial and social returns to investment. How to balance these priorities remains an important issue for policymakers.

In addition to research into tools that may help policymakers manage trade-offs and optimize their decisions, there is a need for more detailed case studies of the various procurement models that provide information as to how programmes were set up and evolved over time, documenting good practices and lessons learned. How middle- and high-income countries implement and finance school food procurement is another important aspect that should be explored in further case studies. This aspect is particularly relevant for countries that are transitioning from externally driven programmes to nationally owned programmes; such countries need information regarding the characteristics of government and specific agro-environmental, economic and institutional contexts that make such transitions efficient.

Economic evaluation

Clarifying the specifics of the programme activities will also enable a more accurate estimation of the full implementation costs for the different activities and actors across the supply chains involved. It is particularly important here to capture all hidden costs, including those of contributions made by communities, which are often substantial but have until recently been overlooked.

A standard cost and impact framework (including standardized indicators) for the different implementation models would improve the comparability of cost and cost-effectiveness estimations. As school feeding programmes potentially have simultaneous impacts across multiple domains, an important challenge is how to aggregate these effects in a meaningful way. This is particularly important when comparing the cost-effectiveness of school feeding to that of other interventions. A particular challenge related to the aggregation of the impacts of school feeding stems from the fact that it is not easy to aggregate the value of transfers with that of other effects. Another particular challenge for aggregation is how to quantify the weight accorded by society to consumption by the poor, relative to that by the average citizen.

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5 HOME-GROWN SCHOOL FEEDING: PROMOTING THE DIVERSIFICATION OF LOCAL PRODUCTION SYSTEMS THROUGH NUTRITION-SENSITIVE DEMAND FOR NEGLECTED AND UNDERUTILIZED SPECIES

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ABSTRACT

This chapter maps the processes and pathways through which home-grown school feeding (HGSF) can increase localized, nutrition-sensitive demand for agricultural commodities. The chapter analyses the linkages in the HGSF model between agriculture, nutrition and agrobiodiversity, with a specific focus on neglected and underutilized species (NUS) and micronutrient-rich crops. By generating a structured demand, HGSF procurement creates mediated markets that are explicitly shaped by considerations related to geographic localization and the diversity of the commodity basket. If these mediated markets are designed well and function effectively, they can help make food networks more resilient, sustainable and nutrition-sensitive. The chapter presents evidence from Ghana and Nepal to illustrate this. It analyses the structural, behavioural, ecological and cultural challenges and constraints of promoting local production systems in specific agroecological and market contexts. The chapter highlights the need for HGSF interventions to be strategically integrated with other national agricultural support efforts and interventions related to nutrition-sensitive agriculture, especially those related to agrobiodiversity and climate-smart agriculture.

5.1 Introduction

This chapter discusses the concept and design of home-grown school feeding (HGSF) with a specific focus on agrobiodiversity and nutrition-sensitive agriculture. The discussion includes a conceptual exposition of the different pathways and processes through which HGSF interventions can affect functional agrobiodiversity in terms of nutrition. This is followed by a discussion on production diversity, with illustrative evidence from Ghana and Nepal. The issue of localization in the context of HGSF is also briefly examined. Key challenges and constraints are then analysed in some detail. Finally, the conclusion looks at issues related to evidence, research gaps and next steps.

5.2 Home-grown school feeding

The concept of HGSF was launched by the New Partnership for Africa's Development of the African Union in 2003 as a component of the Comprehensive Africa Agriculture Development Programme (Food and Agriculture Organization of the United Nations [FAO] and World Food Programme [WFP], 2018). There is no precise figure for the number of HGSF programmes that are implemented globally. According to some estimates, at least 47 countries in sub-Saharan Africa (SSA) were implementing school feeding programmes in 2014, of which at least 20 were HGSF or similar models (Singh and Fernandes, 2018). Globally, 46 countries have HGSF programmes that are supported by WFP (WFP, 2021). While there is significant evidence on the impact of HGSF in terms of nutrition and education, evidence on agricultural outcomes that are directly related to HGSF is relatively limited (Drake *et al*., 2017). However, there is increasing recognition that HGSF can change dietary habits at the household level and affect smallholder production and markets (Drake *et al*.,2017).

While the scope and content of HGSF can vary depending on the context and specific objectives, HGSF has recently been defined as "a school feeding model that is designed to provide children in schools with safe, diverse and nutritious food, sourced locally from smallholders" (FAO and WFP, 2018). Key principles of HGSF include local food procurement, smallholder engagement, the provision of nutritious food, dietary diversity and regularity in meal provision. The definition of local, as well as the scale and type of farmer engagement, varies significantly depending on the country

context. Conceptually, in terms of farmer engagement, HGSF procurement creates mediated markets through structured demand. This demand is explicitly shaped by considerations of geographic localization and a diversified commodity basket that is based on menus reflecting local nutrition needs and agricultural production (Conway *et al.*, 2017). If these mediated markets are designed well and function effectively, they can help make food networks more resilient, sustainable and nutrition-sensitive.

While HGSF can improve farm incomes by providing a predictable market outlet, the main agricultural component should focus on promoting nutrition-sensitive agriculture through the localized engagement of small farm systems. Small farm systems are reservoirs of agrobiodiversity, associated indigenous knowledge and primary supplies of essential micronutrients (Heywood, 2013; Herrero *et al.*, 2017). In most countries in Asia and Africa, agriculture is dominated by small landholdings; it is estimated that 85 percent of family farms in SSA are smallholdings with a farm size of less than 2 hectares (Bélières *et al.*, 2013), and in most cases of less than 1 hectare (Rapsomanikis, 2015). Given that school menus focusing on nutrition form the basis of food procurement contracts, HGSF has the unique potential, as a national programme, to contribute towards the diversity of agricultural production by engaging small farmers.

5.3 HGSF meal design: concept and methods

The method used to develop school meals critically determines the strength of local agriculture linkages. Indeed, the characteristics of the school feeding commodity basket guide the nature and extent of the impact of HGSF on agricultural diversity. There is no single standardized method of developing school feeding menus in HGSF models. In addition, the methods have evolved since HGSF's first applications in Africa. Indeed, the focus is increasingly on neglected and underutilized species (NUS) and specific micronutrients. This section briefly discusses the conceptual parameters of designing meals. Meal sets (one meal set consists of six meals – one for each school day of the week) are designed separately for different regions, most often based on administrative subdivisions such as districts, counties or states, and agroecological zones. All meals are designed jointly by community representatives (including teachers, parents, farmers, etc.) based on menu development guidelines.

To ensure a certain degree of dietary diversity, meals include a minimum number of food groups (three to five). The food groups are determined based on national food-based dietary guidelines or other similar national guidelines and consultations with relevant government departments and independent country experts. A list of NUS crops with their respective nutritional properties serves as a point of reference for the inclusion of these crops in meals. The cost and total nutrient content of the dishes is evaluated using available tools and software (FAO and WFP, 2018).

Nutrient level targeting is usually based on recommended dietary allowances (RDA) set by FAO and the World Health Organization (WHO) for specific age groups and national food-based guidelines, if available. RDA represents the amount of a nutrient that ensures that the nutrient requirements of nearly all the population (97.5 percent) are met. In many cases, a national nutrition expert working group is set up to deliberate over and formulate nutrient targeting recommendations. Issues related to bioavailability are also addressed. A wide range of nutrients are considered in the process of planning meals, including carbohydrates, protein, calcium, fat, niacin, thiamine, riboflavin, iodine, vitamin A, vitamin C, zinc, iodine and iron. While nutrition targets for meal planning cover all major macro- and micronutrients, the focus nutrients can be country-specific, based on the public health status and priorities. At the global level, iron, vitamin A and iodine are considered especially important as their deficiencies, particularly among women and children, pose a significant public health burden (Allen *et al.*, 2009). From a public health perspective, other important micronutrients include zinc, folate, vitamin B12 and other B vitamins, vitamin C, vitamin D, calcium, selenium and fluoride (Allen *et al.*, 2009).

RDA targets for daily meals are based on national policies and guidelines. RDA targets can be the same for all nutrients or can differ between specific nutrients or nutrient groups.[1] For example, in Nepal, the nutrient target for a single meal is currently set at 30 percent of the RDAs for all nutrients (Nepal, Ministry of Education, Science and Technology, 2019). In Nigeria, RDA targets differ between nutrients: 30 percent for energy and fat, and 50 percent for protein, vitamin A, zinc, folate, vitamin C and iodine (Nigeria, National School Feeding Coordinating Unit, 2019). It is important to note that the actual nutrient quality of meals may differ significantly from national standards.[2]

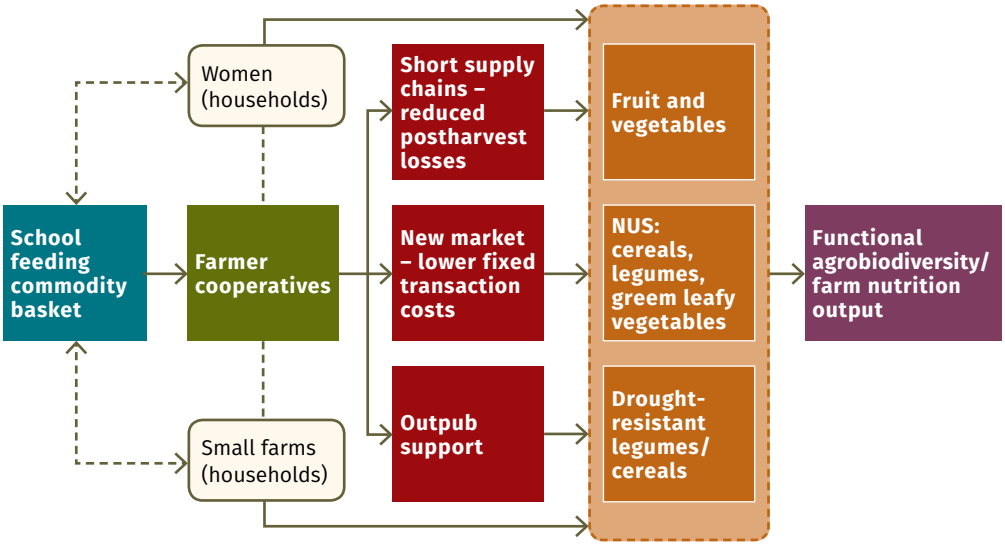
[1] For a summary of nutrient standards for some countries, see FAO, 2019.

[2] For a summary of the actual nutrient composition of school meals in low and middle-income countries, see Gelli *et al.*, 2015.

5.4 HGSF, nutrition, agriculture and agrobiodiversity – exploring pathways and processes

There are clear mechanisms and pathways through which HGSF drives nutrition and agrobiodiversity in local agricultural production systems. These mechanisms are primarily based on transfers of incentives and, to a lesser degree, of knowledge (see Chapters 11, 12 and 33 for examples and complementary analysis of these transfers). The incentives are market-based in the sense that the structured demand for certain commodities creates production incentives for a certain segment of farmers. Knowledge transfer relates to the increased awareness of the nutritious value of certain foods in households. Figure 1 illustrates the key interfaces and pathways through which HGSF may impact upon agrobiodiversity.

Figure 1 **Pathways linking HGSF and agrobiodiversity**



Source: author's elaboration.

The use of forward contracts between farmer cooperatives and nearby schools creates three distinct and interrelated pathways of market incentives for production systems:

- Short supply chains: short supply chains reduce the need for storage, thus minimizing the risk of postharvest losses and storage costs (Conway *et al*., 2017). This is relevant for all foods, but especially for fruits and vegetables (including green leafy vegetables), which are most at risk of spoilage during storage and transportation. This element is of particular importance in low-income countries, where storage facilities for vegetables (except for roots and tubers) are generally very limited, and commercial processing is almost non-existent.
- Lower transaction costs: the structured demand of school feeding though forward contracts lowers fixed transaction cost (FTCs) such as the costs of finding a buyer, price negotiations, etc. The element of proportional transaction costs such as those of transport is covered in forward contract costing. While both components are equally important in market development, studies show that FTCs play a significant role in the decision-making process on market participation (Key, Sadoulet and Janvry, 2000). One study shows that a household's decision as to whether or not to participate in a market is largely influenced by FTCs, while the intensity of participation is more influenced by proportional transaction costs (Jagwe, Machethe and Ouma, 2010). This is particularly critical in the context of neglected crops.
- Output support: the forward contract acts as a clear output support mechanism with guaranteed prices for fixed quantities across a diverse range of commodities.

As far as agrobiodiversity pathways are concerned, the commodity basket for HGSF ideally focuses on three overlapping food categories i.e. fruits and vegetables, NUS and drought-resistant crops. These categories do not represent food groups but are based on nutritional and ecological characteristics. They are not mutually exclusive, and food items can fall in more than one category.

The market incentive pathways mentioned above affect the farm output commodity basket, which is a function of two elements here: demand and the procurement strategy. Demand is determined by the school feeding menu, which is designed to be nutritionally balanced and diverse and focuses on micronutrients. The procurement strategy focuses on local small farmers and women farmers by working with farmer cooperatives and groups. Both demand and the procurement strategy contribute

to the diversity of the commodity basket. While exact figures vary widely across regions, overall, the contribution of women and small farmers to agricultural output is especially large for non-staple food groups such as fruits, vegetables and legumes (Joshi, Joshi and Birthal, 2006; Malapit and Quisumbing, 2015). In most contexts, women are the primary decision makers on the diversity of household consumption; they also tend to be more responsive to nutrition-sensitive production incentives (FAO, 1999; Malapit and Quisumbing, 2015; Rukmani *et al*., 2019).

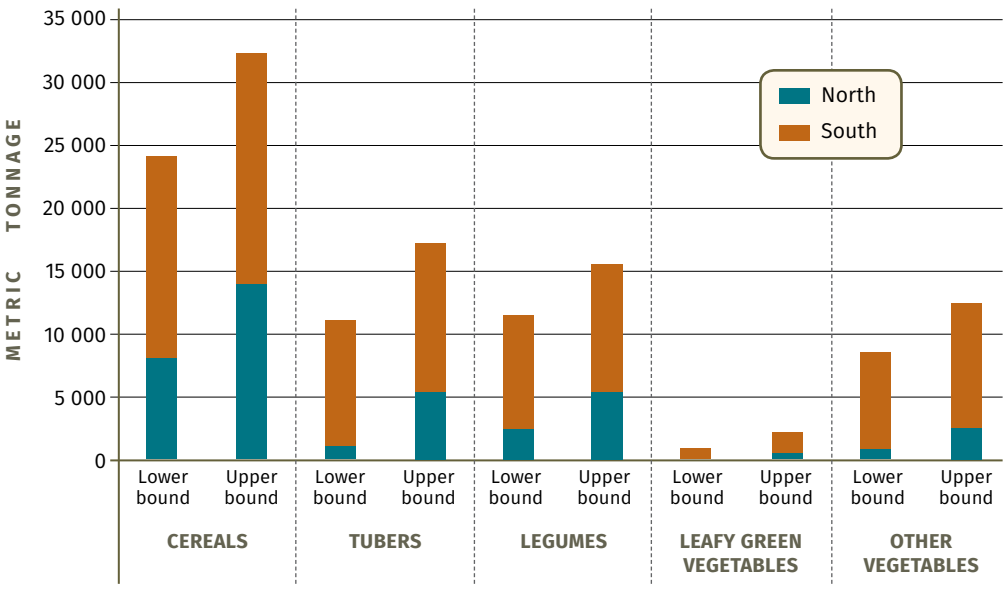
Finally, the incentives for a diverse commodity basket through the institutionalized mechanism of HGSF lead to better agrobiodiversity and farm nutrition output (the amount and diversity of nutrients produced by a farm). Over time, increased household consumption begins to boost the demand for food, in addition to the increased demand from school feeding. There is strong evidence to suggest that in low-income countries, production diversity is linked with increased dietary diversity, both at the national level and at the community level (Remans *et al*., 2014). However, this link depends on the level of analysis and methodology, and may not hold true in many cases. At the micro level, a number of variables come into play, including agroecology, terrain, access to markets, proximity to market channels, proximity to international borders, etc., which all determine the type and level of interaction between local production and consumption.

Knowledge transfer pathways, shown in Figure 2 as dotted arrows, can lead to the incorporation of certain foods in household consumption. This can be due to an increased awareness of the nutrition value of specific foods resulting from the participation of parents or children in school feeding programmes. Parents, many of whom are farmers, participate in school feeding through school-based parent committees and may be involved in the supervision and design of school meals. Emerging evidence of programmes in Uganda, Nepal and Nigeria suggests that children influence dietary habits at home based on their school meal experiences, especially if school meals are accompanied by school-based nutrition education. This can eventually lead to incremental shifts in the cultural perception of certain undervalued nutritious foods, especially when complemented with school- and community-based nutrition education.

5.5 Promoting production diversity

HGSF interventions create a diverse aggregate structured demand for all key food groups. The scale and extent of the diversified demand is an important factor in driving production diversity. A simulated demand analysis from a study on the Ghana School Feeding Programme provides an idea about the scale of diversified demand by food group that can be generated by a HGSF intervention (Singh and Fernandes, 2018). This simulation was based on school feeding menus from 24 districts, which were extrapolated to compute national demand.[3] As the figure below shows, the demand for all food groups is significant. Demand is highest for cereals (24 376 to 32 306 tonnes), followed by legumes (11 532 to 15 588 tonnes), tubers (11 235 to 17 279 tonnes) and other vegetables (8641 to 12 531 tonnes).

Figure 2 **HGSF demand simulation results for annual national demand for various food groups from the Ghana School Feeding Programme**



Source: Singh and Fernandes, 2018.

[3] "North" includes Northern, Upper East and Upper West regions, while "South" includes the other seven regions of Ghana. The lower bound is the result of the extrapolation of the numbers for the menu from the region with the lowest quantity of each food group; the upper bound is the result of the extrapolation of the numbers for the menu from the region with the highest quantity of each food group.

In order to promote deliberate nutrition-sensitive agricultural diversity, HGSF models must be customized specifically towards promoting production diversity and supporting micronutrient-rich foods and NUS. Special attention should be paid to the stress tolerance qualities of the foods (certain local varieties and cultivars of millet, barley and rice have excellent drought tolerance and nutritional qualities). Promoting local agrobiodiversity is not limited to micronutrient-rich foods only; it also involves the promotion of local cultivars of major staples, such as rice. Besides these qualities, it is also important to consider the acceptability of food in terms of tastes and religious or cultural sensitivities.

By way of illustration, a summary of a school meal designed for the Jumla district of Nepal is presented in Table 1. Jumla lies in the high mountain region of Nepal, over 800 km north-west of the capital, Kathmandu. Ingredients are listed by weight in the first column, while the amounts for the main nutrients for each ingredient are listed in the following columns. The last row presents the percentage of the target nutrient quantity achieved for each specific nutrient. The target nutrient quality for HGSF in Nepal is 30 percent of the RDAs for all nutrients, as per the programme's design and objectives. This particular meal achieves or exceeds the target for almost all nutrients, and especially for vitamin A, zinc and iron, which are of particular concern in Nepal (Nepal, Ministry of Health and Population *et al*., 2016).

The cereal staple in this meal is naked barley (*Hordeum vulgare* var. *nudum*). Naked barley is one of the oldest cultivated grains, and a source of complex carbohydrates (Gabrovská *et al*., 2002; Arendt and Zannini, 2014). It is a NUS mountain crop and one of the eight mandate crops of a project of the United Nations Environmental Programme (UNEP) on mountain crop genetic diversity.[4] Meanwhile, the primary source of vitamin A in this menu is lamb's quarters (*Chenopodium album*), known in Nepal as bethe leaves, which contributes 120 mcg of this vital nutrient to the meal. *Chenopodium album* is an underutilized plant that grows as a weed on farms; it is known to be drought-resistant and highly nutritious (Poonia and Upadhayay, 2015). The leaves are rich in essential amino acids and contain calcium and vitamin A in significant amounts (Poonia and Upadhayay, 2015). Another NUS included in this meal

[4] The UNEP project is entitled *Integrating Traditional Crop Genetic Diversity into Technology: Using a Biodiversity Portfolio Approach to Buffer against Unpredictable Environmental Change in the Nepal Himalayas.*

is red horse gram (*Macrotyloma uniflorum*), an underutilized legume crop and a good example of a nutritious food that is culturally undervalued. It is primarily cultivated by poor and marginal farmers in India and Nepal and is considered a poor man's food (Aditya *et al.*, 2019). Horse gram is rich in iron and other macro- and micronutrients, and is known to have a high stress tolerance (Aditya *et al.*, 2019).

Table 1 **Example of a HGSF meal for the Jumla District, Nepal**

INGREDIENT	WEIGHT	TOTAL COST	CALCIUM	NIACIN	RIBOFLAVIN	THIAMINE	VITAMIN C	ENERGY	FAT	PROTEIN	VITAMIN A	ZINC	IRON
	g	NPR	mg	mg	mg	mg	mg	kcal	g	g	mcg	mg	mg
Naked barley, white (uwa)	80	4	20	0	0	0	0	276.8	1.28	10.08	0	1.2	3.28
Onion stalks (green)	10	0.7	5	0.03	0.003	0	1.7	4.1	0.02	0.09	4.95	0.099	0.743
Coriander leaves	5	0.25	9.2	0.04	0.003	0.0025	6.75	2.2	0.03	0.165	28.825	0.034	0.07099999
Taro tubers, raw	20	1.7	6.036	0.012	0.006	0.012	0.366	74.4	0.034	0.662	0	0.082	0.132
Sunflower oil	2	0.32	0	0	0	0	0	18	2	0	0	0	0
Peas (dry)	50	2	37.5	1.7	0.095	0.235	0	159.5	0.95	9.85	0	1.55	3.525
Bethe leaves	25	1.5	37.5	0.15	0.035	0.0025	8.75	7.5	0.1	0.925	120	0.245	1.05
Horse gram, red	10	0.8	0	0	0	0	0	32.2	0.085	2.111	0	0.271	0
Total	**202**	**11.27**	**115.236**	**1.932**	**0.142**	**0.252**	**17.566**	**574.7**	**4.499**	**23.883**	**153.775**	**3.481**	**8.801**
			55%	53%	52%	93%	177%	103%	32%	140%	102%	103%	164%

Source: Nepal, School Feeding Technical Assistance Project Office, email message to the author, 4 November 2019.

5.6 HGSF localization and agrobiodiversity

Localization is a well-discussed issue in food governance studies, and has also been thoroughly analysed in the context of HGSF (Hinrichs, 2003; Sumberg and Sabates-Wheeler, 2011). The nature and meaning of locality is variable; it can range from a country to a village community. The narrative of localization, which creates a local-global binary, was originally constructed as a form of resistance to the globalized capitalist agricultural system (Hinrichs, 2003; Tregear, 2011). This spatial dimension has evolved into a focus on local food systems with their specific relationships and processes and capability to improve local development practices (Barbera, 2014). The promotion of local, alternative food systems is increasingly seen as an economic and rural development strategy (Van der Ploeg *et al*., 2000).

While the conceptual issues related to localization are important, localization is a functional aspect across two interrelated components in the context of promoting agrobiodiversity. One component is agroecology, which is inherently tied to geography and determines the type of available crops. Local conditions can also be a critical factor for the seasonality of micronutrient-rich foods. The degree of localization for this purpose is country-specific, depending on the level of agroecological variation. In countries with a high level of agroecological heterogeneity, localization would need to be more contextualized geographically to take these variations into account.

The second component is culture and communities. In many parts of the world, particularly in Asia and Africa, rural inhabitations are based on tribe or caste or other ethnic or cultural affinities. These factors have a significant influence on the appreciation of different foods, production patterns, dietary behaviours and traditional knowledge. Promoting agrobiodiversity and nutrition-sensitive agriculture is as dependent on these sociological and cultural factors as it is on ecological conditions. For example, the Santhal tribal community of Jharkhand, India, consumes plant seeds, mushrooms, shellfish and a wide variety of meats and indigenous fruits and vegetables (Ghosh-Jerath *et al*., 2016); these foods thus enjoy a wide acceptability. A localized HGSF procurement strategy can include some of these foods, given that even in areas inhabited predominantly by members of the Santhal community, schools are frequented by children from all backgrounds. Similarly, in agro-pastoral communities, which are demographically significant in many countries,

HGSF production diversification pathways must be aligned with the unique food and nutrition security challenges of agro-pastoral communities (Rufino *et al*., 2013, Galiè *et al*., 2019).

5.7 Key challenges and constraints

There are numerous constraints to the promotion of NUS through a community-based localized demand model such as HGSF. These constraints can be divided into four interconnected categories: structural, behavioural, ecological and cultural. Structural constraints include the lack of availability of planting material (such as seeds and vines), fertilizers and pesticides, or agricultural extension support. Ecological constraints include the long growing periods of some NUS crops (which disturb existing cropping patterns), poor soil quality and a higher vulnerability to pests and disease of some NUS. Behavioural constraints relate to the difficulties of changing established production and dietary patterns. Some traditional crops and vegetables may also require more farm work for soil management and supervision. Cultural constraints relate to the consideration of certain foods as "inferior" for a variety of reasons, including their association with consumption by people who occupy a low position in the socio-economic hierarchy (e.g. red horse gram in Nepal).

The fundamental assumption of the HGSF model is that modern local production systems have the potential for a greater production diversity, which allows them to respond to a diversified food demand. Intuitively, this assumption is more likely to hold true in places with good agricultural productivity and minimally suitable ecological conditions for agrobiodiversity. However, even in places where these criteria are met, the validity of this assumption may often be called into question. Increasing amounts of land are being left fallow in many rural communities in countries such as Nepal, as new generations prefer non-agricultural employment in urban centres or abroad (Singh, 2020). Furthermore, the lack of agricultural support in low-income countries in the form of subsidies or the provision of inputs makes agriculture a financially risky livelihood method. Thus, the HGSF model is unlikely to promote local production in certain contexts. On the contrary, in the short term, HGSF interventions may distort thin local markets, as traders sell to schools through cooperatives. The dynamics of the model are quite distinct in regions with limited agricultural output.

Depending on the climate and the length of growing periods, the commodity basket for HGSF may include preserved and dried foods.

Another factor that affects the functioning of the HGSF model is seasonality. Indeed, the seasonality of agricultural production and dietary intake has direct implications on the promotion of agricultural diversification through HGSF. These implications vary significantly by agroecological zone and food group; they are a function of growing seasons and school calendars. There are two aspects to the issue of seasonality. One aspect relates to overall food deficiency during the lean season; the other relates to making HGSF commodity baskets seasonality sensitive. The demand for school feeding is constant for all school days. In most cases, there is a substantial overlap between the agricultural lean season (also known as the hunger season) and school days. The extent of overlap can be seen easily by comparing the harvest and school calendars. Depending on the region, the lean season can last between two to four months.

Although stocks of commodities such as cereals, legumes and tubers may be initially available during the lean season, limited on- and off-farm storage capacities may mean that those stocks eventually dwindle. This may cause serious food deficits at the household level and price rises on the free market (Vaitla, Devereux and Swan, 2009). This may consequently have a serious impact on localized food procurement. Furthermore, during the hunger season, the increasing costs of staples and the intensification of calorific hunger may undermine any food diversification strategies. Studies on seasonality show that the impact of seasonality on the production of micronutrient-rich crops such as fruits and vegetables depends greatly on local conditions, and can be very significant (Sibhatu and Qaim, 2017). This confirms that HGSF interventions must be adapted, to the extent possible, to geographical localization and the local context.

To promote quality production diversification, HGSF meals should be designed to include as many local nutrient-dense foods rich in iron, vitamin A or zinc as possible. However, it is important to take note of some key demand-side constraints. HGSF programmes provide one meal a day; they should be based on national nutrition guidelines and on a fixed budget allocation per child and per meal. In terms of volumes and costs, protein- and energy-rich staples are the most prominent types of food, and a balance must always be found between portion sizes and costs.

Given the issues mentioned above, the total amount of nutrient-rich foods required can be quite limited in terms of the volume of total demand. Furthermore, in places where schools are very dispersed and enrolment numbers are low, aggregation of supplies may not be possible. Under these circumstances, the pathway of structured demand for certain micronutrient-dense foods may become quite weak.

5.8 Conclusions

The process and pathways through which different elements of HGSF can affect agrobiodiversity and nutrition-sensitive agriculture are increasingly well recognized. A substantial number of studies on the linkages between agriculture and nutrition provide evidence as to the positive impact of agricultural development programmes on production and consumption diversity (Ruel, Quisumbing and Balagamwala, 2017). However, HGSF and its impacts on agriculture and nutrition is still only an emerging area of research, and empirical studies are needed to evaluate the scale and nature of the impact of HGSF in terms of nutrition-sensitive agriculture and production diversity in a range of settings and contexts. A number of ongoing studies in South Asia and West Africa aim to evaluate the extent to which such HGSF interventions at scale promote the production of nutritious food for human dietary needs and improve nutrition-related production diversity.

The focus of HGSF on promoting diversified production is primarily aimed at improving nutrition security. In resource-poor contexts, some of the structural and ecological constraints discussed in this chapter can severely limit the ability of HGSF interventions to promote diet quality through production diversity. For example, in the absence of seeds and agricultural extension support, the demand from school feeding, especially for a neglected crop, will not be sufficiently enabling for small farmers. HGSF interventions must therefore be integrated, wherever possible, with other national agricultural support efforts and interventions related to nutrition-sensitive agriculture, and especially with those related to agrobiodiversity and climate-smart agriculture.

Finally, the most critical and immediate challenge facing agriculture as a whole, and localized production systems in particular, is climate change. Events related to climate change are reducing yields and distorting cropping patterns across the globe. Rainfed smallholder farming systems in highlands and the tropics – which constitute 80 percent of the world's cropland and account for 60 percent of global agricultural

output – are the most vulnerable to these events (Bioversity, 2017). This has direct and significant implications on agrobiodiversity and the supply of nutrition. The most serious consequences are observed in resource-poor agricultural economies dominated by small farms. While a focus on drought-resistant crops is part of the HGSF model, the design of the model must be further developed to provide answers to the multifaceted challenges of climate change for local production systems and diets.

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6 DEVELOPMENT OF STRATEGIES FOR THE INCLUSION OF FISH IN SCHOOL FEEDING IN ANGOLA, HONDURAS AND PERU

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ABSTRACT

Fish and fish products are an important, yet often underestimated source of nutrients and have a huge potential to improve food security and nutrition. In countries with a high prevalence of malnutrition and poverty, school feeding programmes have the potential to improve children's nutrient intake and improve the livelihoods of fishing communities by integrating locally produced fish in school meals. The Governments of Angola, Honduras and Peru have, with the support of the Food and Agriculture Organization of the United Nations (FAO), developed pilot innovations for the inclusion of locally sourced fish into school feeding programmes; these efforts have demonstrated the benefits and feasibility of including fish products in such programmes, taking local fish species and food habits into consideration. This chapter discusses challenges and lessons learned, and presents recommendations for project replicability and for the future integration of fish into school feeding programmes. The chapter concludes that the successful replication of these initiatives in other countries requires many actions, including the transformation of the chapter's key recommendations into a toolkit.

6.1 Introduction[1]

Globally, approximately 2 billion people suffer from multiple forms of malnutrition, including micronutrient deficiencies (often referred to as hidden hunger), overweight and obesity (Food and Agriculture Organization of the United Nations [FAO] *et al*., 2019). Malnutrition compromises both physical and cognitive development from a young age and can affect people's health status over their lifetimes. Beyond the human costs of malnutrition, the estimated impact on the global economy could be as high as USD 3.5 trillion per year, or USD 500 per individual. These enormous costs result from economic growth foregone and lost investments in human capital; these lost investments are associated with preventable child deaths, 45 percent of which can be ascribed to poor nutrition, as well as premature adult mortality linked to diet-related non-communicable diseases (NCDs) (FAO, 2013; Global Panel on Agriculture and Food Systems for Nutrition, 2016). Although the prevalence of chronic malnutrition (stunting) has declined over the past 10 years to about one in five children, childhood obesity is on the rise (FAO *et al.,* 2019). An increasing number of children and young people are surviving but not thriving due to poor diets and malnutrition (United Nations Children's Fund [UNICEF], 2019). Many children are not getting the nutrients they need to grow and develop well, particularly during the crucial first 1 000 days, from conception to their second birthday. Much attention is focused on these first 1 000 days, as it is a crucial period for physical and cognitive development. There is, however, evidence that child growth extends for another 7 000 days (Crookston *et al.,* 2013; Fink and Rogers, 2014; Bargava, 2016; Georgiadis and Penny, 2017; Bundy *et al*., 2018).

To address malnutrition, it is necessary to understand dietary patterns and food choices and the food environment that affect these patterns and choices, at every stage of the child's or adolescent's life. As many developing countries have seen rapid urbanization and globalization, diets have changed as the result of a nutrition transition characterized by a shift away from local cereals, fruits and vegetables, nuts, seeds and fish to processed and non-local foods with high fat, salt, sugar and

[1] Special acknowledgments are due to the participants in the many workshops, meetings, teleconferences and discussions organized in the framework of the project. These participants include programme consultants and specialists from FAO headquarters, FAO regional offices and FAO country offices in Angola, Honduras and Peru, researchers, government officials, representatives of non-governmental and private-sector organizations, and other stakeholders.

refined carbohydrate contents, and terrestrial animal-sourced foods (ASFs) such as red meat (UNICEF, 2019; Popkin, Adair and Ng, 2012; Pingali *et al.*, 2019). This nutrition transition and the globalization of diets has stimulated much discussion on healthy diets from sustainable food systems; dietary recommendations for a decreased consumption of terrestrial ASFs, and particularly red meat, have been a primary focus of these discussions (Willett *et al.,* 2019). While the nutrition transition has resulted in the increased consumption of terrestrial ASFs in urban centres (Popkin *et al*., 2012; Delgado, 2003; Bett *et al*., 2012), many rural poor communities still rely heavily on predominantly plant-based diets (Henjum *et al*., 2015; Torheim *et al*., 2010; Becquey and Martin-Prevel, 2010). In these communities, the low or zero consumption of ASFs results in an inadequate food intake and a low absorption (or bioavailability) of important micronutrients such as zinc, iron and vitamin A. These micronutrients are often deemed "problem nutrients", as they are deficient in the diets of more than two billion people globally (Adesogan *et al*., 2019; Barré *et al*., 2018; Thilsted *et al*., 2014; Ferguson *et al.,* 2006).

Recognizing the importance of poverty for nutrition, the World Food Summit and the New Partnership for Africa's Development consider the fight against poverty and malnutrition as vital. They have supported several initiatives to improve school feeding programmes (FAO and World Food Programme [WFP], 2018). School feeding programmes have been used for decades to alleviate hunger, improve education outcomes, increase enrolment rates and reduce absenteeism – especially for adolescent girls (Bundy *et al*., 2018). Indeed, these potential outcomes have been the key reasons for the implementation of school feeding programmes, which are often led by the education sector (United Nations [UN], 2017).

When school feeding is designed to provide schoolchildren with safe, diverse and nutritious food that is sourced locally from smallholders, it is called home-grown school feeding or HGSF (FAO and WFP, 2018). HGSF has a huge potential to enhance local economies and livelihoods by accelerating progress towards food security and nutrition (Sustainable Development Goal [SDG] 2) and poverty eradication (SDG 1). HGSF also contributes to other SDGs of the 2030 Agenda, including SDG 4 on quality education, SDG 5 on gender equality, SDG 8 on decent work and economic growth, SDG 10 on reduced inequality and SDG 17 on partnerships for achieving the goals (FAO, 2019a). In addition, HGSF boosts the local economy by sourcing specifically from

smallholder producers; by doing so, it supports the livelihoods of local citizens and ensures diversified school menus that include a variety of locally grown foods. As such, HGSF contributes to SDGs 14 and 15 by promoting the sustainable use of the oceans and protecting biodiversity, both in terrestrial and aquatic environments (FAO and WFP, 2018).

While including a diverse basket of locally grown crops into school feeding programmes, HGSF programmes in low-income countries tend to focus on plant-sourced foods from local farmers, as public procurement in these countries is unlikely to sustain the costs of including meat (Drake *et al.,* 2017; Baum, Miller and Gaines, 2017). Often excluded from HGSF programmes due to cost and food safety concerns, fish plays an important role in the livelihoods and diets of many people in developing countries. Fish has a unique nutritional composition of essential fatty acids, proteins and micronutrients such as iron, zinc, iodine, vitamin A and B12 (High Level Panel of Experts on Food Security and Nutrition [HLPE], 2017; Ferguson *et al.*, 2006). Fish is also an important contributor to global animal protein intake, accounting for more than 50 percent of total intake in some coastal countries and small island states (FAO, 2019b). The consumption of locally grown micronutrient-rich foods should be an integral element of policies related to food security and nutrition and should be encouraged in school feeding programmes. Fish products could play an important role in this respect (FAO, 2016).

The role of fish in school feeding: a background on pilot studies in Angola, Honduras and Peru

The role that fish can play in reducing levels of malnutrition is increasingly recognized (Thilsted *et al.*, 2014). Discussions at the Regional Forum on the Introduction of Fish into School Feeding, held in Uruguay in 2015, revealed that fish products are hardly ever included regularly in school menus in Latin America, despite their availability and accessibility. As a result, the Governments of Angola, Honduras and Peru requested assistance from FAO and INFOPESCA to develop strategies to support public procurement programmes to improve school feeding programmes by including fish in their meals.[2]

[2] INFOPESCA is the Centre for Marketing Information and Advisory Services for Fishery Products in Latin America and the Caribbean. For more information on the project *Development of strategies for the inclusion of fish in school feeding in Angola, Honduras and Peru*, please visit INFOPESCA's website at **www.infopesca.org/node/2426**.

The school feeding programme of Uruguay was presented as an example of a successful programme that has run continuously for more than 100 years; the programme requires fish on the menu at least once a week. Angola, Honduras and Peru face three very different realities. Peru has the highest fish consumption in Latin America and Honduras the lowest; Angola is in Africa. The project's objective was to develop a strategy to include fish in school feeding programmes; the selection of these three countries added an important component of learning from each other's experiences. It is important to highlight that while the Governments of Angola, Honduras and Peru have all adopted policies and programmes to guarantee food and nutrition security, with a special focus on children, food insecurity and malnutrition persist in each of these countries (see also Chapter 9 and Chapter 17 for complementary analysis of the experiences of Honduras and Peru). Chronic malnutrition, particularly linked to long-term malnutrition during the first 1 000 days of life, affects nearly one-third of children in Honduras and 38 percent of children in Angola; the rates of stunting of children's mental and physical development in rural and inland areas are even higher (Global Nutrition Report, 2018; The Borgen Project, 2015). While the national stunting rate in Peru stood at 13 percent in 2016, higher rates – similar to those in Angola and Honduras (33 percent) – are seen in rural areas of the Peruvian Amazon (WFP, 2020). In addition, many children do not get enough iron, which is particularly important for the transport and storage of oxygen and assists the immune system in our bodies. Iron-deficiency anaemia (which affects 50 percent of children in Honduras, and 25 percent of children in Peru) causes children to miss school and affects their school performance (Chong *et al.*, 2016).

Fishing activities greatly contribute to livelihoods in Latin America; however, fish consumption in the region has historically been low (FAO, 2017). In Honduras, fish consumption is very low in comparison to the global average (3.3 kg/capita in Honduras versus a global average of 20.3 kg/capita). Peru is the only country in the region where fish consumption exceeds that of all red meats combined (23.9 kg/capita per annum, accounting for 26.5 percent of total animal protein intake) (FAO, 2017, 2019b). Across the Atlantic, fishing activities off the west coast of Africa contribute greatly to employment and gross domestic product (GDP). In Angola, where small-scale pelagic fisheries are a main source of livelihoods and food for coastal communities, fishing contributes to nearly 5 percent of GDP (FAO, 2018).

Fish consumption in Angola is close to the global average (19.5 kg per capita) and contributes 35 percent of the total consumption of animal protein (FAO, 2019b).

This chapter is based on the results of FAO project Development of Strategies for the Inclusion of Fish in School Feeding in Angola, Honduras and Peru, which was a broad-based collaborative effort involving INFOPESCA and the Governments of Angola, Honduras and Peru. The chapter presents the results of pilot studies that aim to promote the inclusion of fish in school feeding programmes in the three countries. These studies were carried out by FAO in collaboration with the national governments of the pilot countries between June and November 2019. Based on challenges encountered and lessons learned, the chapter formulates recommendations for school feeding programmes in these three, and other, countries. The chapter is organized in sections that discuss the school feeding programmes in each country and present diagnostic studies, discuss project implementation activities, analyse the lessons learned from these activities, and formulate recommendations and conclusions.

6.2 Background and diagnostics on school feeding programmes in Angola, Honduras and Peru

This section provides some background information regarding the school feeding programmes in each country and presents details of the diagnostic studies carried out under the project in each country to identify the feasibility of including fish in school feeding programmes. This diagnosis looked at the availability of fishery products, as well as the benefits and challenges of incorporating fish into public school feeding and other institutional feeding programmes, such as those in hospitals, correctional facilities and the armed forces.

Angola

Food policies in Angola focus on economic growth, sustainability and the diversification of production, in both the agriculture and fisheries sectors. This includes strengthening the organizational and productive capacities of farmers and small producers, supporting local food production and providing nutrition education – three activities where the role of school feeding programmes is getting

increased attention. In 2013, the Angolan Government implemented a school snack (not a complete meal) programme in certain schools to address high levels of malnutrition and improve school attendance. This is a national programme whereby the Government collaborates with private companies that provide public schools with foods that are prepared in school canteens or community kitchens. However, in most cases, the nutritional profiles of these foods do not reflect the nutritional needs of school-aged children.

Angola is one of the main producers of fish in sub-Saharan Africa. The captures of pelagic species (such as *Sardinella* and horse mackerel) in the country are significant (FAO, 2018). The potential nutritional impact of including fish in the diet of school-aged children is recognized by the Angolan Ministry of Education, which supervises the school feeding programme. However, cold chains are inadequate in many parts of the country; as a result, the provision of fish, be it fresh or frozen, might not be an option as its food safety cannot be guaranteed. In addition, most schools lack adequate infrastructure for the storage and preparation of meals that include fresh fish.

Honduras

A school feeding programme has been implemented in Honduras since 1998 with a view to boosting school attendance, improving the quality of life and reducing levels of malnutrition among schoolchildren. The food given to the children at school is mainly based on maize, rice, beans, oil and a pre-prepared mix of maize and soy flour. The school feeding programme is part of a governmental programme entitled Healthy Schools, which aims to reduce poverty and promote a healthy environment at both the physical and mental level.

Diagnostic studies investigated fish production and barriers to fish consumption in Honduras. Honduras is one of the main exporters of fish in Central America; its exports consist mainly of tilapia. About 12 000 tonnes of tilapia are exported annually, from both small- and large-scale producers. However, fish consumption in Honduras is among the lowest in the world, at an apparent per capita consumption of only 3.3 kg per year (FAO, 2019b). Bad quality, high prices and the lack of a local tradition to eat fish are the main factors causing the low fish consumption.

The association of fish producers of Honduras (APPIH) has provided access to small producers to financial resources and enabled them to negotiate the price of feed and other inputs. The number of tilapia producers is growing, and their contribution to the local economy as well as to food security is increasing. These tilapia producers were identified as a possible source of affordable, locally produced fish for school feeding programmes.

Peru

In the 1970s, the Peruvian agency that provides services to the fisheries sector (EPSEP) started to promote the consumption of fish products. Frozen horse mackerel was promoted in the Andean highlands, and the consumption of small pelagic fish (such as the Peruvian anchoveta) was encouraged. FAO supported this initiative in collaboration with the former technological fisheries institute of Peru (ITP). This collaboration resulted in the creation of the national programme entitled *A Comer Pescado* (Eat fish). This programme promotes fish consumption in general; it has increasingly focused on developing educational material for schoolchildren, such as information material on the benefits of fish consumption, healthy and tasty recipes, storybooks for children and material on the importance of protecting the marine environment.

The national school feeding programme Qali Warma provides breakfasts and lunches to 63 110 public schools; it reaches more than 3.8 million children every school day. However, the inclusion of fish in school feeding is, in most cases, minimal. Previous policies had been developed to facilitate the purchasing of low-cost Peruvian anchovies and giant squid for use in public institutions. However, these policies were abandoned, mainly due to challenges in meeting quality standards and a lack of national processors. Currently, school meals include fish 0.5 to 2 times per week; however, there is no formal requirement to include fish in school meals. The areas where fish consumption is low are the same areas where fish is seldom included in school meals. The supply of fish products through Qali Warma is still limited for various reasons, including consumption preferences, the limited availability of products that meet quality and safety standards, and the lack of efforts to promote fish consumption. The provision of fish products based on, for example, Peruvian anchovies is very cost-efficient; however, there is a need to improve processing

facilities to meet the required standards. Although the programme is considered highly successful, factors such as cost, availability, nutritional knowledge, etc. make that the composition of the meals provided often does not meet children's nutritional requirements.

Prior to the pilot studies by FAO, efforts under the *A Comer Pescado* programme on the one hand and those under the Qali Warma programme on the other were not formally coordinated. The pilot project was seen as an opportunity to collaborate and achieve the common goal of improving nutrition and food security among children. The diagnostic study revealed that a number of structural challenges still persist, such as the inadequacy of cold chains for fish products and the lack of infrastructure at schools (e.g. adequate kitchens, dining rooms and storage facilities to handle fish products).

6.3 Awareness raising and knowledge sharing

The initial stages of the project focused on the promotion of the inclusion of fish in schoolchildren's diets and awareness raising as to its importance among the personnel of public and private institutions developing food policies. In March 2019, the national authorities of the three project countries were invited to a meeting in Lima, Peru, where the benefits of the inclusion of fish in school feeding programmes were discussed. In addition, the results of the diagnostic studies were presented, with a focus on the availability of fish and difficulties and barriers to the incorporation of fish in their respective school feeding programmes.

Study tour to Uruguay

Uruguay was used as a positive example of how fish can be included in school feeding. In March 2019, a study tour to the country was organized to promote the sharing of knowledge. Uruguay has a school feeding programme that has been successfully implemented for more than 100 years; under the programme, fish is included at least once a week in school meals. About two thirds of all children enrolled in public schools receive at least one meal daily, and 90 percent of all schools receive some type of food assistance. Priority is given to schools in vulnerable areas. Uruguay's

national directorate for aquatic resources (DINARA) is implementing a programme to facilitate the inclusion of fish products into institutional markets such as schools and hospitals; this tool is ideal for introducing fish into school feeding programmes.

The participants from Angola, Honduras and Peru observed how Uruguay's school feeding programme manages to ensure a healthy meal every school day, and include fish in those meals at least once a week. One of the main areas of focus of the programme is the control of the quality and safety of the inputs used and of the hygiene practices of the personnel that prepares the meals. This school feeding programme fulfils three main functions: providing healthy meals, educating students and parents on the importance of healthy eating habits, and teaching etiquette by allowing students to share meals in a social setting.

Following the study tour, the participants returned to the project countries and worked with national and local stakeholders to organize workshops and trainings. The dissemination of knowledge on the importance of the inclusion of fish in school feeding programmes and the provision of training (including on food safety, basic hygiene and food handling and preparation) was a key component of the project. Each country prepared a guide on the benefits of fish consumption, based on local recipes and local fish species. These guides were directed towards school-aged children and adapted to the reality in each country.

6.4 Acceptability trials

Various challenges to the successful inclusion of fish in school feeding were identified, including challenges related to costs, the continuous supply of safe and good quality fish products, desirability and shelf life. Local authorities, chefs and family members were engaged in the identification of fish products that would be desirable, low-cost and safe for children to consume, taking into account the supply of fish and issues related to storage and shelf life. Once the most appropriate fish products were identified, community members and school caterers prepared healthy, balanced meals with these fish products, for children to taste and evaluate. All fish products were checked by the food safety authorities in each country prior to these acceptability trials. Various types of fish products were used to prepare meals for school children,

including fish soup, fish pie and fish croquettes. To assess the acceptability of the menus by students, a five-point hedonic scale was used (1 – extreme dislike; 2 – dislike; 3 – neither like nor dislike; 4 – like; 5 – extreme like). It was found that acceptance reached up to 80 percent in the target student population.

In Peru, several products based on the Peruvian anchoveta (*Engraulis ringens*), a fish that is available in significant volumes and used primarily for animal feed, were developed and tested. A salted and semi-dried anchoveta that was already being produced by small, local processing units driven by women was tested in school feeding programmes; it was found that this anchoveta had a level of acceptability among schoolchildren of around 90 percent. Meanwhile, a canned product based on whole anchoveta had a level of acceptability of close to 100 percent.

In Honduras, three different recipes including tilapia or bass were tested for acceptability. A traditional dish was prepared using fillets, while the heads and bones were used to prepare a soup. This ensured that the entire fish was used, which delivers more micronutrients and at the same time reduces food losses and waste (Bogard *et al*., 2015a). The dishes were tested for acceptability in three schools in the municipality of Ilama in the department of Santa Barbara and in one school in Tela. Although fish consumption in Honduras is among the lowest in the world and children are not used to consuming much fish, the schools reported a 100 percent acceptance rate of the dishes among schoolchildren.

In Angola, mackerel (*carapau*) is the most popular fish in many areas, as it is often more affordable than other types of fish. The project tested three different preparation methods (fish soup, fish pie and fish croquettes) that use fish powder processed from dried mackerel. All three fish products were highly acceptable to schoolchildren.

Based on these initial results, which showed a high acceptance of fish by schoolchildren, the Governments of Angola, Honduras and Peru are currently exploring the feasibility of upscaling the inclusion of fish into school feeding programmes in those regions of each country where the availability and acceptance of fish is greater. In addition, areas were identified where fish in school feeding could have the greatest impact on nutrition, and where stakeholders such as non-governmental organizations and small businesses have the capacity to scale up initiatives. Recommendations for further actions are presented in Section 6 of this chapter.

6.5 Lessons learned and discussion

Each country in this study developed and adapted strategies to integrate fish into school feeding, based on local fish supply, food culture and acceptance of different fish products. Although different strategies were used, the results show that similar methodologies can be used across various contexts. Raising awareness and providing nutrition education to value chain actors who are no experts on nutrition, including consumers, parents, teachers, cooks, politicians and fish producers and processors, can improve the understanding of the nutritional benefits of fish and support positive outcomes beyond child nutrition (Hong *et al.,* 2010). To help raise awareness, the project developed guides directed towards children on the benefits of eating fish; the guides also provided examples of low-cost fish dishes based on locally available fish products.

The integration of fish into school feeding programmes provides an opportunity to include affordable, available and sustainably produced ASFs in feeding programmes for children beyond the first 1 000 days of their lives. Fish are more efficient converters of feed into protein than terrestrial animals; the production of fish also has a lower environmental impact, thus offering a source of sustainably produced ASFs (Hilborn *et al*., 2018). Small fish species are available in markets throughout developing countries; they are often more affordable than other ASFs (Thilsted *et al*., 2016) and can provide more micronutrients as they can be consumed whole – including bones, eyes and viscera (Bogard *et al*., 2015a).

The finding of this study that fish products are highly acceptable among schoolchildren is supported by evidence from similar studies; these studies also demonstrate that fish products have the potential to greatly improve micronutrient intake (Bogard *et al*., 2015b; Borg *et al*., 2019a, 2019b; Abbey *et al.,* 2017). As important as providing nutritious meals to school children is ensuring that those meals are safe to eat. Fish is highly perishable and begins to deteriorate immediately upon being taken out of the water. To ensure that fish products are safe for consumers, it is therefore important to ensure proper handling, storing and processing of fish by all value chain actors (Rosenthal, 2019). The processed products included in the project, such as canned anchovies and salted or dried fish, were tested by the countries' food safety authorities to ensure their safety before giving them to children.

As demonstrated by this pilot study, fish that is safe, locally available and acceptable to children can be successfully included in HGSF programmes. Public procurement for such programmes has the potential to promote sustainable and healthy diets including local, culturally acceptable foods, while at the same time supporting domestic food producers and decreasing countries' dependence on imports (Tartanac *et al.*, 2019).

6.6 Recommendations and conclusion

Based on the challenges encountered and the lessons learned during the implementation of the project in Angola, Honduras and Peru, the following recommendations for the sustainable integration of fish into school feeding programmes can be identified:

Set up a multisectoral committee to develop policies and strategies to incorporate fish into school feeding. Engage national and local authorities from various departments (health, nutrition, education, fisheries) and relevant non-governmental actors to develop policies and strategies to effectively incorporate fish and fish products into school feeding programmes.

Use a multi-stakeholder participatory value chain approach to develop acceptable and affordable fish products from available resources and raise awareness of the nutritional benefits of fish. Include children, parents, schools, local fishers and fishing organizations, fish processors and processing organizations, and community members when developing fish products for school feeding.

Governments and stakeholders should address underlying issues such as the lack of infrastructure, sanitation or potable water to ensure the proper handling of fish along the value chain, thus ensuring the food safety and quality of fish products during the postharvest stages.

Develop guides and training materials on the importance of the inclusion of fish in a healthy diet; adapt these materials to the local context and curriculum. By using guides and training materials, awareness can be raised throughout a community about the importance of a healthy diet and the high level of nutrition in fish products.

Awareness-raising efforts should not only be addressed to schoolchildren, but also other family members, teachers, cooks and government authorities.

Understand capacity needs and build the capacity of small-scale fisherfolk to produce safe, acceptable and affordable fish products for school feeding programmes. Small-scale fisherfolk, fish processors and processing organizations may need capacity building in areas of organizational strengthening, food safety, fish handling, fish processing and value-addition. In addition, they may need assistance with access to raw materials or small-scale infrastructure; their finance and business management skills may also need improving.

Invest in the creation, based on the recommendations of this pilot study, of a toolbox of strategies and tools for the introduction of fish in school feeding programmes, to replicate the project's success in other countries. Based on the lessons learned in this project and other past projects that aimed to integrate fish in school feeding programmes, formulate successful strategies and methods to introduce fish into school feeding programmes. Test these tools and produce a toolbox or handbook for integrating fish into school feeding that is adaptable to various country contexts, to replicate the success of this project in other countries.

The importance of food value chains and school feeding for children should be highlighted in the context of the current COVID-19 pandemic situation. Special attention should be given to schoolchildren, regardless of whether or not they attend school during the pandemic. WFP, FAO and UNICEF have jointly formulated interim guidelines to guarantee that schoolchildren continue receiving meals at school and food value chain actors continue to benefit from reliable markets for nutritious food products in different situations (WFP, FAO and UNICEF, 2020).

In conclusion, the project results presented in this chapter demonstrate the benefits, challenges and feasibility of including fish products in school feeding programmes. To successfully replicate the initiatives described in this chapter in other countries, many actions are required, including the creation of a toolkit for integrating fish into school feeding that is adaptable to various country contexts.

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7 THE USE OF GEOGRAPHICAL INDICATIONS IN PUBLIC FOOD PROCUREMENT: THE EXAMPLE OF ITALIAN PRIMARY SCHOOLS

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ABSTRACT

This chapter analyses the inclusion of geographical indication (GI) products in public food procurement (PFP) in terms of their volume and their economic impacts in different models of PFP. The chapter discusses the cases of two Italian municipalities (Parma and Lucca), which have adopted two different business models to manage primary school meals services. First, the regulatory framework for PFP in both municipalities is discussed; then, a Keynesian-derived indicator is used to assess the economic spillover effect into the local economy. Even though GI products have a large presence in certain food categories (e.g. dairy products), overall, they account for only a small proportion of the total volume of food served in the school meals services studied (2 to 2.5 percent). In terms of economic impact, the inclusion of GI products in school meals services provides a positive but limited contribution to the local economy. The main obstacles to including more GI products in PFP are GI products' higher cost, their low availability and access, and regulatory criteria.

7.1 Introduction

A geographical indication (GI) is a name or sign that identifies products by linking them to their place of origin. GI products have specific qualities, characteristics or reputations that stem from natural factors (such as climate, soil or plant and animal species) and social factors (such as local know-how that is passed on from one generation to the next) that characterize their place of origin (Food and Agriculture Organization of the United Nations [FAO] and Strengthening International Research on Geographical Indications [SINER-GI], 2011).

GIs, which are protected as intellectual property rights, can protect a product's reputation, help it stand out in the market place, prevent the misuse of its name and increase producers' incomes by allowing them to charge a price premium – provided GI legislation is adequately enforced and quality control systems are in place (the GI institutional system).

In many countries of the world, GIs are considered a key instrument for policies that seek to promote food quality and rural development (Bonanno, Sekine and Feuer, 2019). Indeed, GIs are collective marketing tools that help preserve and promote traditional quality products; they are also a way of enhancing the provision of public goods such as food heritage, landscapes and traditional knowledge, and support the rural economy. Because of their territorial links, GI products reinforce the role of producers in the value chain, thus playing a key role in the sustainable development of local communities (FAO and European Bank for Reconstruction and Development [EBRD], 2018). The use of GIs can contribute to sustainable development and sustainable food systems (High Level Panel of Experts on Food Security and Nutrition [HLPE], 2017). Indeed, properly established and implemented GIs can ensure economic returns for producers and local communities, which they can invest in the preservation of their specific production system and related local resources.

For consumers, GIs represent a way to identify specific food products with official guarantees in terms of quality and origin. A growing body of literature explores the benefits of GIs in terms of nutrition and health (Summer *et al*., 2017; Montel *et al*., 2014). Most GI products are unprocessed or low-processed food products, which generally have better nutritional qualities than ultra-processed products (Monteiro

et al., 2018, 2019). Studies have shown that many traditional products have good nutritional values that meet nutritional recommendations (Durazzo *et al.*, 2017; Costa *et al.*, 2010).[1]

Many GI products are linked to local biodiversity and indigenous varieties and breeds, which can provide specific nutritional benefits over and above those offered by globally diffused varieties or breeds (FAO and International Centre for Advanced Mediterranean Agronomic Studies [CIHEAM], 2015; FAO and Centre for Indigenous Peoples' Nutrition and Environment [CINE], 2009; FAO, 2010). As a result of traditional growing, breeding, processing, aging or fermenting methods, GI products can present a specific composition of nutrients that contributes to an improved microbiota and health benefits (FAO, forthcoming).

For example, many studies demonstrate the contribution of traditional cheeses to nutrition and health (Summer *et al.*, 2017; Montel *et al.*, 2014; Neviani *et al.*, 2013); the recognition of this contribution grows as the understanding of the importance of gut microbiota for human health increases. Various studies highlight the importance of animal feeding methods (and particularly pasturing) for the nutrient contents of both milk and meat products, with GI products presenting better nutrient values than non-GI products of the same category (Pugliese *et al.*, 2009; Rey *et al.*, 2006; Alfaia *et al.*, 2009, 2006a, 2006b; Casarotti *et al.*, 2017; Daley *et al.*, 2010; Moloney *et al.*, 2008; FAO, forthcoming). Meanwhile, the natural yeasts used for fermentation also provide health benefits. Many GI products are fermented and matured products that are obtained using traditional conservation methods (Coppola *et al.*, 2000; Sanjukta and Rai, 2016; Rizo *et al.*, 2018).

This chapter provides an overview of the weight of GI products in public food procurement. Two Italian cities were selected, Parma in the Emilia-Romagna region and Lucca in the Tuscany region, to analyse the use of GI products in public food procurement for primary school canteens. The two municipalities are examples

[1] Guerrero *et al.* (2009) defines a traditional product as:
a product frequently consumed or associated with specific celebrations and/or seasons, normally transmitted from one generation to another, made accurately in a specific way according to the gastronomic heritage, with little or no processing/ manipulation, distinguished and known because of its sensory properties and associated with a certain local area, region or country.

of two different procurement models studied under the European Union project Strength2Food (S2F) with the aim of assessing their environmental, economic and social impacts.[2] The municipal authorities of both cities are responsible for contracting and managing school meals services; they have developed contract–tendering processes based on national and corresponding regional guidelines. From the analysis and evaluation of the procurement practices in the two cities, the chapter draws recommendations for best practices that exploit the potential of GIs in terms of sustainable public food procurement outcomes.

7.2 The concept of GIs and the link with public food procurement

GI products were officially developed as a category of products during the Punta del Este negotiations on the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement, which led to the birth of the World Trade Organization (WTO) (Addor and Grazioli, 2002; Otten, 2015). The TRIPS Agreement is a minimum standards agreement that requires members to provide extensive protection of intellectual property. Member States are free to determine the appropriate method to implement the provisions of the Agreement under their own legal system and practices. Previously, the 1958 multilateral Lisbon Agreement had defined and protected a category of GI products with a stronger link to origin, the Appellations of Origin (AOs). As a result of the entry into force of the Geneva Act in February 2020, the Lisbon Agreement now offers a multilateral register to protect not only AOs but also the more general GI products.

Two essential elements identify and characterize GI products: the complexity and multifaceted nature of the concept of quality and the multifunctional nature of GI systems. The quality of GI products derives from their close dependence on local natural and social resources, the history of the territory of production, the cultural heritage and the reputation. The reputation of a GI product has developed over time,

[2] Strength2Food is 5-year project funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 678024. The Strength2Food Project brings together some 30 partners across the European Union and East Asia to investigate, *inter alia*, the sustainability of food quality schemes. For more information, visit **www.strength2food.eu**.

and consumers link GI products with the concept of typicality (Casabianca and Touzard, 2009). Typicality is an intrinsic part of GI quality and is perceived by consumers as not reproducible outside the specific geographical origin. The multifunctional nature of GI systems means that their interactions with public goods and their positive externalities, including the generation of financial returns in the areas of origin, the promotion of agrobiodiversity, the preservation of rural landscapes, the revitalization of food traditions and links with tourism, must be considered at the same time (Barham and Sylvander, 2011; Casabianca and Touzard, 2009; Allaire, Casabianca and Thevenot-Motted, 2011; Belletti, Marescotti and Touzard, 2015; Arfini *et al*., 2019b).

GI products promote economic, social and environmental sustainability in the territory surrounding the place of production. This is because such products are, by their nature, strictly linked with the natural and social environment. Indeed, they have a strong local dimension, as they are produced using local plant or animal species, in local production chains.

GIs promote socio-economic development in rural areas and contribute to the production of public goods such as rural landscapes, cultural heritage, the stability of rural communities and environmental protection, for example in less favoured areas (e.g. mountainous areas). The particular linkage between GIs products and their territory of origin underpins local economic growth and local employment (FAO and EBRD, 2018; FAO and SINER-GI, 2011; Arfini *et al*., 2019a, 2019b; Vandecandelaere, 2011, 2016).

The inclusion of traditional, local foods within public food procurement, for example for primary schools, has important implications in the socio-economic and cultural-educational dimensions. The public procurement of local foods strengthens the local socio-economic model and may thus improve the sustainability of the territorial system as a whole. From an educational perspective, the public procurement of traditional, local products may improve cultural and gastronomic knowledge in younger generations. Furthermore, the focus placed on food quality and safety in GI systems may contribute to sustainable, healthy diets.

7.3 The Italian case

The procurement and use of local food and GI products in public school canteens must meet the regulatory requirements that legislators have put in place to promote a balanced diet for school children. In Italy, public tenders are regulated by a framework law (*Codice dei contratti pubblici* [Code of public contracts], 2016) that lays down some important requirements for public tenders, such as the partition of the contract into small lots to stimulate participation by small and medium-sized enterprises (SMEs) and the observance of criteria related to value-for-money and environmental sustainability (see also Chapter 13 for complementary analysis of the Italian experience regarding environmental sustainability criteria). The Italian Ministry of Health lays down additional criteria for food procurement in its national guidelines for school meals (Italy, Ministry of Health, 2010). These national guidelines for school meals are the reference document for all public tenders for school meals. Each Italian region can impose additional criteria through regional laws (see Chapter 27 for an analysis of experiences in Sardinia). Once regional legislation is developed, the municipalities in charge of drawing up the public tender may implement further criteria. The national guidelines for school meals set specific recommendations for school lunches based on children's ages and identify a number of criteria that must be taken into account by municipalities when issuing public tenders for school meals. The national guidelines identify GI products as one of the criteria that municipalities have to follow in the design of public tenders (see Box 1).

BOX 1 Some criteria of Italian guidelines for school lunches

- Use short food distribution chains, and widely use products with few intermediaries between the production and consumption stages. To encourage the use of short food chains, producers are evaluated based on the geographical origin of foods; local products are preferred. In addition, schools are recommended to offer seasonal fruits and vegetables. To ensure that products are sourced through short food chains, regional authorities must draw up criteria to identify tenderers that are able to respect the free movement of products within the community and guarantee their freshness, thus favouring zero-kilometre foods.

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- Transport times between meal or food preparation and consumption must be as short as possible.
- Use protected designation of origin (PDO)[3] products, protected geographical indication (PGI)[4] products, traditional specialty guaranteed (TSG)[5] products and other locally recognized products.
- Use food products with a low environmental impact.
- Use fair-trade food products when no local products are available.
- Repurpose leftovers through welfare initiatives, as a strategy to reduce food waste.
- Monitor users' satisfaction.

Source: **Italy, Ministry of Health.** 2010. *Linee di indirizzo nazionale per la ristorazione scolastica*, pp. 19–20. Rome. (also available at **www.salute.gov.it/imgs/C_17_pubblicazioni_1248_allegato.pdf**).

Overview of the study cases: the municipalities of Lucca and Parma

This chapter analyses the procurement practices for school meals of the municipalities of Parma, in the Emilia-Romagna region, and Lucca, in the Tuscany region.

In addition to the national requirements, *Legge Regionale 29/2002* (Regional Law 29/2002) adds a regional dimension to public tenders for school meals in Parma (Italy, Comune di Parma, 2014) by requiring at least 70 percent of the food products used to prepare school meals to come from organic or integrated agricultural systems,[6] or be typical and traditional products. Preschools and primary schools must use

[3] PDO products are products that are produced, processed and prepared within a specific geographical area using recognized know-how (European Commission, n.d.).

[4] The PGI designation means that a geographical link must occur in at least one of the stages of production, processing or preparation. In addition, the product may benefit from a good reputation (European Commission, n.d.).

[5] The STG designation highlights the traditional aspects such as the way the product is made or its composition, without being linked to a specific geographical area (European Commission, n.d.).

[6] An integrated agricultural system is:
A production system aimed at the valorization of agricultural and agrifood productions in which good agricultural practices are combined with a sustainable use of fertilizers and plant protection products to simultaneously guarantee the cost-effectiveness of agricultural practices and a low environmental impact (Italy, Ministry of Agriculture, Food and Forestry Policies, 2016).

organic food, if available on the market. Other requirements laid down directly by the municipality of Parma include:

- a preference for organic and local raw materials and products (where local means from the province of Parma);
- the use of zero-kilometre products (products sourced within a radius of 100 km from the centre of the city of Parma) and short-chain products (produced in provinces inside Emilia-Romagna or in provinces adjacent to the province of Parma but outside of Emilia-Romagna); no minimum thresholds are defined for this requirement;
- in terms of the organization of logistics, transport methods must be optimal both in terms of time and in terms of the vehicles used (vehicles must have a low environmental impact);
- the use of tap water, instead of water in plastic bottles;
- the use of non-food products with a reduced environmental impact;
- the recycling of food surpluses, primarily in collaboration with non-governmental organizations and third sector associations;
- adequate differentiated waste collection throughout the supply chain;
- the development of food education initiatives for pupils, families and teachers.

According to the criteria above, Parma's procurement model can be defined as a local organic (LOC-ORG) procurement model.

Based on regional guidelines (*Linee di indirizzo regionali per la ristorazione scolastica* [Regional guidelines for school feeding], 2016), the municipality of Lucca lays down the following mandatory criteria in public tenders for school meals:

- suppliers must certify the quality of products and demonstrate the adoption of quality assurance systems and good manufacturing practices that ensure the traceability and labelling of products;
- the following products must be organic: pasta, fruits and vegetables (including potatoes) (both fresh and frozen), legumes, meat (meat must be sourced in Italy or in other countries of the European Union), milk, yogurt, eggs, butter and olive oil (olive oil must be extra-virgin);

- cheese must be organic or be recognized as a PDO or PGI product;
- fish must come from Northern Europe (because of its higher content of omega-3 fatty acids), except for trout, which must come from the Tuscany region;
- adequate differentiated waste collection must be applied throughout the supply chain.
- suppliers are allowed to reuse any leftover food.

Based on these considerations, Lucca's procurement system is characterized by a heavy reliance on organic products, followed by products with European Union certifications (e.g. PDO and PGI) and products from short food chains. No quantitative criteria for either organic or GI products are laid down. In sum, Lucca's procurement model can be defined as an organic (ORG) procurement model.

Although Italy's national guidelines for school meals include the requirement to use GI products as one of the criteria for tenders, the two municipalities analysed do not lay down additional GI criteria (except for Lucca's requirement to use PGI cheese and spelt).

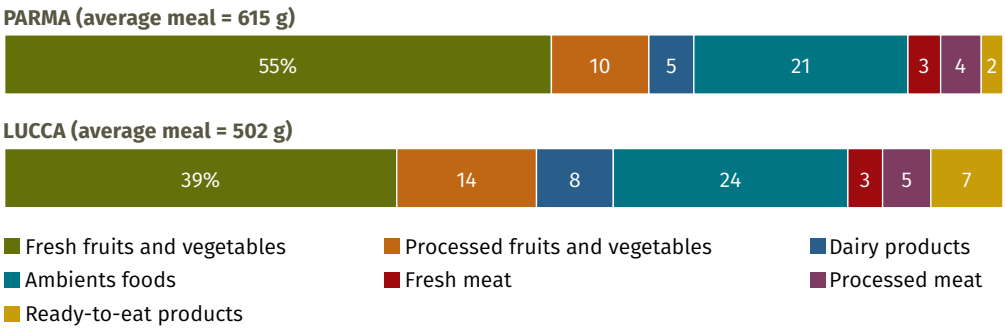
Primary schools in Parma and Lucca offer lunch meals that are carefully designed and approved by municipal dieticians.

In Parma, menus typically include a daily single-option meal comprising a starchy-based first course (e.g. pasta, rice, soup), a protein-based second course (e.g. eggs, meat, fish, legumes) and a side dish of vegetables, bread and fruit. Dessert is served only on special occasions, such as before holidays. A private catering firm prepares the meals off-site and then transports them to most schools (or 25 schools) in the municipality. The exceptions are starchy-based dishes, which are prepared on-site in the 25 schools. In the remaining eight schools, all ingredients are delivered directly to schools and cooked on-site, in school kitchens. Information for the 2017/18 school year (see Tregear *et al.*, 2019) shows that the average meal served in schools in Parma weighed 615 g in total and comprised 55 percent fresh fruits and vegetables, 10 percent processed vegetables, 5 percent dairy products, 21 percent ambient products,[7] 3 percent fresh meat, 4 percent processed meat and 2 percent ready-to-eat products.

[7] Ambient foods are foods with a long shelf-life that can be stored at ambient temperature (e.g. pasta, rice, olive oil, flour, etc.); bread is also considered as an ambient food.

In Lucca, the structure of the menus is similar to that in Parma, although dessert is served more frequently, as a substitute for fruit. A private catering firm prepares and cooks all the meals in a central kitchen; the meals are then transported to the schools where only cereal-based dishes (e.g. pasta and stock-based soups) can be assembled by using sauces or other dressings. Information for the 2017/18 school year (see Tregear *et al.*, 2019) shows that the average meal weighed 502 g and was comprised of 197 g (39 percent) of fresh fruit and vegetables, 119 g (24 percent) of ambient foods, 70.5 g (14 percent) of processed fruit and vegetables, 38.5 g (8 percent) of dairy products, 35.5 g (7 percent) of ready-to-eat products, 24.7 g (5 percent) of processed meat and 17.1 g (3 percent) of fresh meat. The average meal contained high proportions of fresh and processed fruit and vegetables (53 percent) and ambient foods (24 percent). Bread and pasta accounted for the bulk of the ambient foods (more than 60 percent of the total volume of ambient foods).

Figure 1 **Composition of the average school meal in Parma and Lucca**



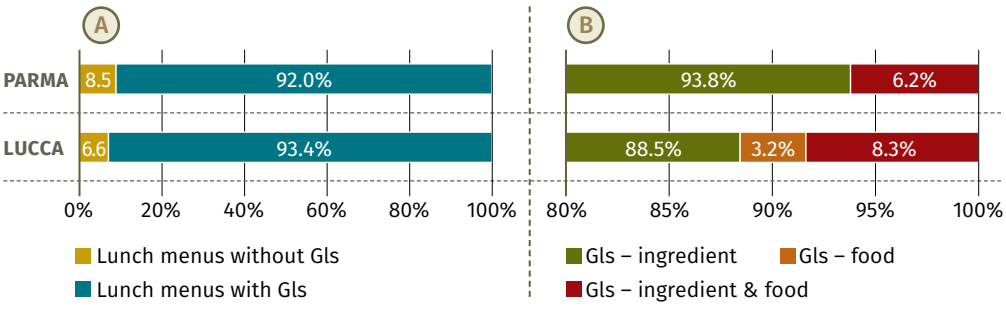
Source: authors' elaboration.

Presence of GI products in school lunch menus in Lucca and Parma

In both municipalities, more than 90 percent of menus served during the school year 2017/18 included GI products. Most of these products are seasoned cheese products, followed by cured meat and cereals (i.e. spelt) (see Figure 2A). Parmigiano Reggiano PDO (cheese) and Prosciutto Crudo di Parma PDO (cured meat) were served in both municipalities; Bresaola della Valtellina PGI (cured meat), Grana Padano PDO (cheese), Pecorino Romano PDO (cheese) and Farro della Garfagnana PGI (wheat) were served

only in Lucca, while Asiago PDO (cheese) and Taleggio PDO (cheese) were served only in Parma. Out of 167 school menus used in Lucca over the school year, 156 menus (93.4 percent) contained GI products. Of these, 138 menus (88.5 percent) contained at least one GI product as an ingredient of the first course, the second course or the side dish, while five menus (3.2 percent) contained one GI product as an ingredient of the second course. In the remaining 13 menus (8.3 percent), GI products were served as both an ingredient and a ready-to-eat food. Out of a total of 177 menus in Parma, 162 contained GI products. Most of these (152, or 93.8 percent) contained GI products as ingredients, while only a few (10 menus, or 6.2 percent) included GI products as both an ingredient and a ready-to-eat food (see Figure 2B).

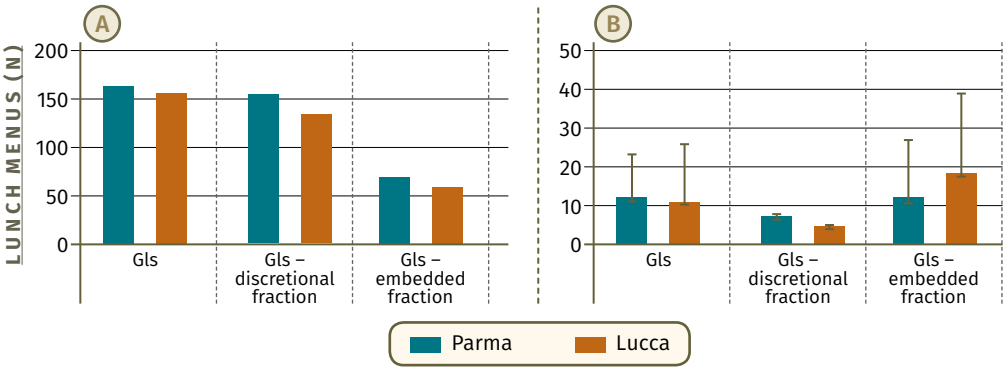
Figure 2 **The share (A) and use (B) of GI food products in lunch menus in primary schools in Parma and Lucca during the 2017/18 school year**



Source: authors' elaboration.

A further analysis can be made by distinguishing embedded GI food products, or GI products that are already included in meals, from GI products that can be added to the meals in discretional amounts by the pupils themselves. In practice, the only GI product that could be added by the pupils in both Parma and Lucca was grated Parmigiano Reggiano PDO (cheese). Fifty-nine meals in Lucca, and 69 meals in Parma, contained embedded GI products. Meanwhile, 134 school menus in Lucca and 154 school menus in Parma allowed pupils to add grated Parmigiano Reggiano PDO cheese to their first course, if they wanted to do so (Figure 3A). The average amount added was 5 g in Lucca and 7.5 g in Parma (see Figure 3B). The average amounts of embedded GI products served within the menus were 18.7 ± 20.4 g in Lucca, and 12.3 ± 14.9 g in Parma.

Figure 3 **Number of school lunches providing GI food products (A) and average amounts of GI food products included in menus (B) in primary schools in Lucca and Parma during the 2017/18 school year**

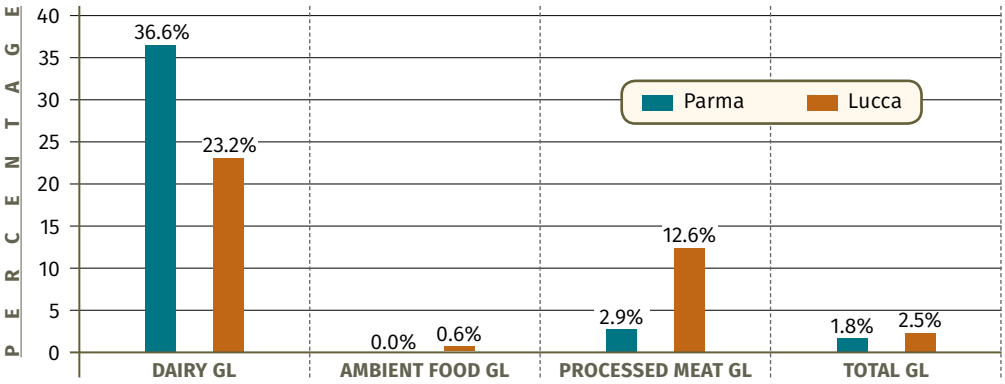


Note: the data are further divided into the number of menus presenting GIs (and their average amount in grammes) for discretional use and embedded in the meals served to a single pupil.

Source: authors' elaboration.

In both municipalities, GI food products represented only a small proportion of the average weight of food served in school canteens: 1.8 percent in Parma and 2.5 percent in Lucca. However, the analysis of the share of GI products in individual food categories is interesting. The food categories where GI products are most present are dairy products and processed meat (see Figure 4). Just over 36 percent of all dairy products in Parma and 23 percent of all dairy products in Lucca included GIs, namely PDO hard cheeses (such as Parmigiano Reggiano, Grana Padano, Pecorino Romano, Asiago and Taleggio). Parmigiano Reggiano, which is used mostly as a condiment for pasta dishes, represented 34 percent of the dairy food category in Parma and 14 percent in Lucca. Prosciutto di Parma PDO and Bresaola della Valtellina PGI (cured meats) are included in menus throughout the year, resulting in a high presence of these GIs within the processed meat category. The proportion of GI food products in the category of ambient foods is negligible; only one food product (i.e. Farro della Garagnana PGI spelt) is used in to prepare school meals in Lucca.

Figure 4 **Proportion of GI food products in the average school meal in primary schools in Parma and Lucca, by food category (school year 2017/18)**



Source: authors' elaboration.

Local economic impact of the inclusion of GI products in school meals in Parma and Lucca

The analysis of the contribution of GI products to the local economy and its development requires an adequate methodology that is able to capture the extent to which evolutions in the food supply chain affect local economic growth in a clear and reliable manner. This study used local multiplier analysis or LM3 (Sacks, 2002; Bengo *et al.*, 2016) to assess these spillover effects (Tregear *et al.*, 2019).

Parma

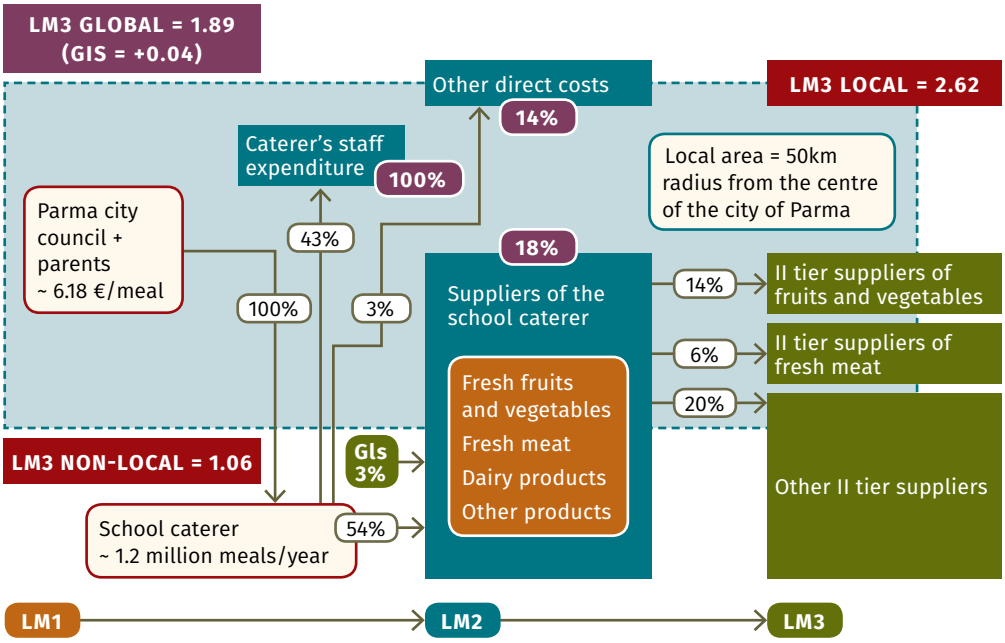
The local boundary for the study of Parma was defined as a 50 km radius from the seat of the city council in the city of Parma. The resulting area takes in the entire Parma province; parts of remote mountainous areas and the neighbouring province of Reggio Emilia are excluded.

As shown in Figure 5, the first flow of expenditure in the chain (LM1) was the transfer of money from the city council of Parma (the budget holder) to the caterer in Parma (the budget recipient). To calculate the size of the budget, the total annual number of meals served by the caterer was multiplied by the fixed price per meal as stipulated in the contract.

The second flow of expenditure (LM2) started from the caterer. Forty-three percent of the caterer's entire budget was spent on staff, 54 percent on suppliers, and 3 percent on other direct costs. To determine retention/leakage, it was assumed that all staff expenditure was retained locally, as the entire staff of the caterer was resident within the local area.

The distribution of the caterer's budget for food suppliers was estimated based on information provided by the city council and agricultural prices from ISMEA, the Italian institute for services to the agricultural food market. This information was used to calculate the economic weight of each first-tier supplier in the caterer's total budget. It was found that 3 percent of the entire budget of the school caterer in Parma is spent on GIs products, mainly Parmigiano Reggiano cheese and Parma ham.

Figure 5 **Local multiplier analysis (LM3) of the school meals service in Parma**



Source: authors' elaboration.

The third flow of expenditures in the chain (LM3) was private spending by the staff working in the Parma caterer (i.e. their own discretionary income expenditure) and the business expenditures of first-tier suppliers on staff and upstream suppliers. For suppliers of GI products, the share of expenditure that is retained within the local area in overall expenditure is slightly lower than 50 percent.

Based on these estimates, the global LM3 ratio for the school meals chain in Parma was found to be 1.89. This means that for every EUR 1 spent by the initial generators of the budget (i.e. the city council of Parma and the schoolchildren's parents), an additional EUR 0.89 is generated within the local area. The contribution of GI products is very limited; of each EUR 1 spent on GI products for school meal services, only EUR 0.04 (or 4 percent) is retained within the local area.

Lucca

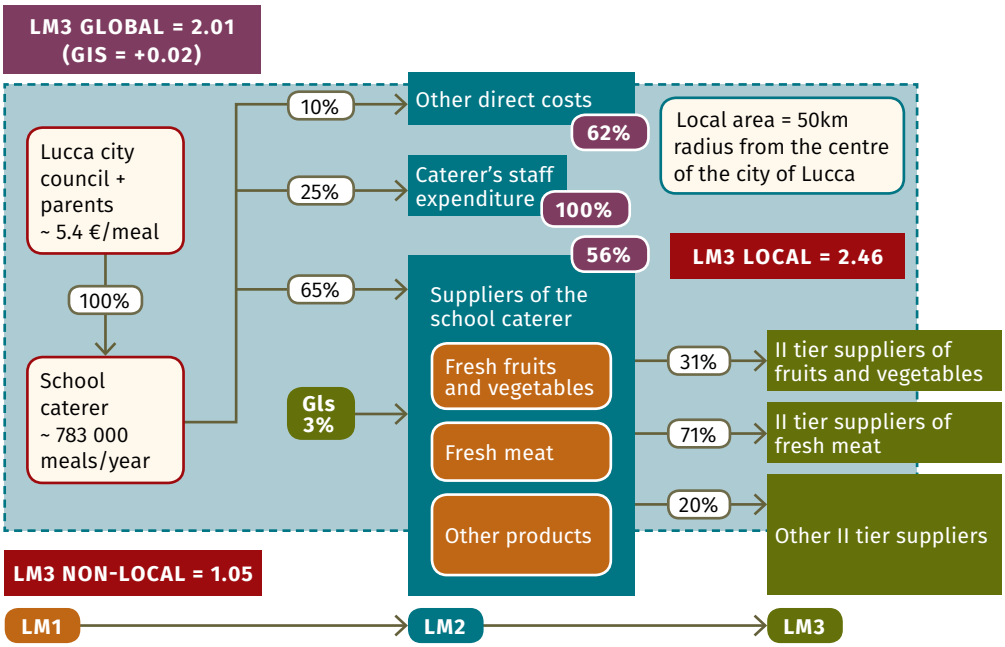
The analysis of the economic spillover effects of the school meal services in Lucca adopted the same approach as that used for Parma. The analysis started with the first flow of expenditure (LM1) – the budget available for overall school meal service procurement in Lucca (Figure 6).

The second flow of expenditure in the chain (LM2) is the budget spent by the caterer in Lucca on staff, suppliers and other direct costs. Based on the expenditure data provided by the caterer, it was established that 25 percent of the caterer's expenditure was on staff, 65 percent on suppliers and 10 percent on other direct costs. To determine retention/leakage, it was assumed that most of the staff expenditure was retained locally, as the entire staff of the caterer resided within the local area.

About 3 percent of the school caterer's budget was used to buy GI products (PDO hard cheeses and PDO/PGI processed meat).

The results for the LM3 stage were obtained based on the same criteria as those used for the Parma case. The proportion of the expenditure on GI products that is retained within the local area is negligible, since the upstream agricultural and processing activities for every GI product served in Lucca develop outside the radius of 50 km from the city centre.

Figure 6 **Local multiplier analysis (LM3) of the school meals service in Lucca**



Source: authors' elaboration.

Based on these calculations, the LM3 ratio for the school meals chain in Lucca was estimated at 2.01. This means that for every EUR 1 spent by the initial budget generators (i.e. the municipality of Lucca and parents), an additional EUR 1.01 is generated within the local area. The share of GI products in this spillover effect is 2 percent, meaning that every euro from the school meals budget generates an additional EUR 0.02 within the local area, due to its effects in the GI supply chain.

Conclusions and limits of the Parma and Lucca case studies

This study evaluates the relevance of the inclusion of GI products in primary school canteen menus in volume terms, and assesses its economic spillover effects. The calculation of the LM3 indicator is useful to track the financial flows within local areas at the different stages of the school meal supply chain. The indicator helps understand to what extent the inclusion of GI products in school meals services contributes to the local economy.

Most of the menus proposed throughout the school year in Parma and Lucca include GI products, mainly hard cheeses (e.g. Parmigiano Reggiano) and cured meat (e.g. Parma ham). GI products are frequently embedded as an ingredient in dishes; some are added to the plate by the pupils themselves. GI products are more frequently included in certain food categories, such as dairy products or processed meat products. However, overall, GI products account for only a small share of the total volume of food used for school meals services (2 to 2.5 percent).

The economic relevance of the inclusion of GI products in food procurement for school meals services is modest; its spillover effect into the local economy is positive but very low (4 percent for Parma and 2 percent for Lucca). The following factors help explain why it may be difficult to boost the procurement of GI products for school meals:

- the competitive disadvantage suffered by GI products compared to their non-GI counterparts due to their higher average market price;
- the lack of scale in the production of many categories of GI products (e.g. fruits and vegetables); and
- the terms of public contracts, which do not lay down clear and mandatory proportions for GI products in procurement for school meals.

The main findings of this study should be considered relevant for the two case studies of Parma and Lucca only. Indeed, food procurement schemes for school meals services depend on regional food procurement rules (which determine *inter alia* the minimum share of Gl and organic foods in menus), municipal guidelines, caterers' size and the organization of their food purchasing, and capacities to promote the inclusion of GI foods in school menus.

The LM3 indicator proposed in this study is a static indicator of the economic spillover effect induced by school meals services in Parma and Lucca, and its accuracy is limited to the timespan used in the analysis. Changes in economic relationships, market factors and supply chain organization would necessitate a new assessment, which would result in a different estimate of the economic impact. Furthermore, a comprehensive evaluation of the economic effects of the inclusion of GI products in school meals services requires the analysis of its impacts on the perception of the embedded values of GI products and on the food spending behaviour of the children's

families. Such an analysis may help develop new strategies to inform citizens about the embedded values of GI products through actions in primary schools.

7.4 Conclusion

GI products and processes have the potential to contribute to the building of sustainable food systems that provide healthy diets through multiple entry points in the economic, social and environmental pillars that underpin sustainable development. However, this contribution depends on national, regional and local regulatory frameworks, as well as on the characteristics of production and consumption systems. The production of GI foods may contribute to many public goods (from the food, cultural and natural heritage to local employment and diversified diets). Hence, including GI foods in public food procurement, and especially procurement for school canteens, is particularly relevant:

- From the point of view of producers, public food procurement provides an interesting market for GI products, especially if the food is used in or close to the area of production; the resulting revenues for producers boost the viability of the GI system.
- From the point of view of consumers, and especially children, the inclusion of GI products in public meals services improves access to tasty, healthy food and educates children about their local or national food heritage.
- From the point of view of the territory and society, the inclusion of GI products in public food procurement can enhance the contribution made by these products to rural development and the provision of public goods.

Italy has a long tradition in the production of GI foods, and Italian consumers are keen on their traditional and local products (Fondazione QualiVita, 2020).[8] The analysis of the cases of the two Italian municipalities in this study can therefore be used to draw more general lessons about how to include GI products in public food procurement, and how to maximize the environmental and socio-economic impacts of doing so.

[8] For the complete list of GI products in Italy, see the European Commission's register of geographical indications, eAmbrosia, at **https:/ /ec.europa.eu/info/food-farming-fisheries/food-safety-and-quality/certification/quality-labels/geographical-indications-register/database** (European Commission, 2020).

A key finding of this study is that despite the importance of GI products in Italy and their inclusion in national and regional guidelines for tendering, the actual volume of the GI products that are included in menus is rather low – and consequently, so is their contribution to the provision of public goods (measured in this study as the spillover effects into the local economy). The main obstacle to the inclusion of GI products in public food procurement is linked to the fact that GI products are generally niche products, and are often produced by traditional or small-scale producers.

Actions that may increase the share of GI products in school meals and thus improve diet diversity and education on food and agriculture include:

- communication strategies developed by GI consortia and addressed to municipal officers, caterers, teachers and families, to raise awareness about the multiple benefits of GIs products;
- initiatives to allow pupils to discover the various dimensions of GI products (the farmers, landscapes, biodiversity, rural communities, etc.) through, for example, field trips, tasting sessions, meetings with producers and the dissemination of information in schools;
- the development of new frameworks for tendering that make the public purchasing of local GI foods flexible throughout the school year, thus enabling small producers to participate in tenders for the procurement of school meals services;[9]
- the formulation of specific agrifood policies that help GI producers participate in the market of public food procurement by promoting new models of organization of GI supply chains; and
- the development of new recipes that include local GIs products for meals offered in schools, to familiarize school-aged children with these products and their quality aspects.

The dominant motivation for promoting the inclusion of GI products in public food procurement may well not be its effects on producers and the territory, but rather its effects on consumers. Indeed, even a limited presence of GI products in school canteens

[9] An example of a flexible framework is the dynamic purchasing system used by the Bath and North East Somerset Council (in the United Kingdom of Great Britain and Northern Ireland), whereby the school service contract remains open for new suppliers; qualified suppliers can participate in frequent competitions during the year to provide schools with local and seasonal products.

and other public places constitutes an opportunity to educate consumers about food taste, variety and quality and their cultural and natural heritage, and thereby improve their diets, nutrition and health. The link between GI products and these dimensions is a promising area for further research that aims to improve food habits worldwide.

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8 PUBLIC PROCUREMENT AND THE DEVELOPMENT OF SMALLHOLDER AGRICULTURE TO HELP BUILD SUSTAINABLE FOOD SYSTEMS: THE CASE OF THE BRAZILIAN STATE OF SANTA CATARINA

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ABSTRACT

At the end of the twentieth century, a new paradigm related to the sustainability of food systems arose. This new paradigm is based on the empowerment of rural producers and recognizes the potential of family farmers to contribute to the building of sustainable food systems. Against this background, the present chapter discusses public procurement policies, focusing on how local purchasing can enhance family farmers' potential to contribute to building of sustainable food systems. The chapter analyses the allocation of resources under the Brazilian National School Feeding Programme (PNAE) for the purchasing of products from family farmers in the Brazilian State of Santa Catarina. Its main observation is that efforts under the PNAE to include local smallholders as suppliers empower farmers to organize themselves and access other formal markets. The architecture of PNAE allows for policy continuity, and even growth, despite recent political changes in government.

8.1 Introduction

The unsustainability of food systems has become increasingly evident since the last quarter of the twentieth century (Marsden, 2018). Indeed, climatic events of grand proportions and the widespread depletion of resources have laid bare the limits to the expansion of current modes of food production, which are increasingly leading to widespread and diverse (food, fuel, financial and fiscal) crises. These crises generate deep-rooted inequalities and hunger, demonstrating that food systems are becoming unable to feed populations. Although the growth rate of food production is larger than that of the global population, levels of malnutrition have been increasing since 2015 (Food and Agriculture Organization of the United Nations [FAO] *et al.*, 2018).

Against this background of unsustainability, a new paradigm of food sustainability, with food security at its heart, has emerged. This paradigm goes beyond narrow environmental aspects to respond to fundamental social and economic questions about the sustenance of human life, the safeguarding of human health, etc. The food system is thus perceived as complex, and closely linked to space and place (FAO, 2014; Marsden and Morley, 2014). In a sustainable food system, the relationship between the production and consumption of food and nature is reconsidered to ensure that natural resources can be enjoyed indefinitely.

One of the goals of the new paradigm is to overcome social and spatial inequalities. It is closely intertwined with locally focused agricultural development strategies, centred around territoriality, innovation, biodiversity, agroecology and family farming using family labour (Francis *et al.*, 2003; FAO, 2014). A locally-based sustainable food system is seen as a way "to achieve synergies between sustainability, security, sovereignty and effective resource governance"; it is argued that "a more place-based eco-economic model needs to be progressed" (Marsden and Farioli, 2015, p. 331). The new paradigm builds on local development strategies to empower rural producers and boost resilience (Marsden, Moragues-Faus and Sonnino, 2018). It is able to manage the mobilities and vulnerabilities resulting from the concentration and peripheralization that food systems tend to reinforce (Marsden, 2009). In short, the new paradigm is an alternative model to improve the social, economic and environmental sustainability of food systems based on family farming (FAO, 2014).

Considering the central role in food systems played by family farmers, the Brazilian Government made it compulsory in 2009 to use at least 30 percent of the federal resources dedicated to the National School Feeding Programme (PNAE) to purchase products from family farms (see Chapters 2, 9, 10, 11, 12, 14, 15 and 16 for additional analysis of the Brazilian experience).

This chapter analyses support for family farming to build sustainable food systems, based on three considerations the:

- growing understanding of the unsustainability of predominant food systems, and the search for a sustainable food system;
- role played by family farmers in the building of sustainable food systems; and
- ability of public procurement to boost the contribution of family farming to the building of sustainable food systems.

This chapter analyses the empirical case of PNAE in the Brazilian State of Santa Catarina to help understand the potential of public policies. Family farmers have a significant presence in the state of Santa Catarina; their organizations are well distributed across the territory and they strongly participate in local and formal markets. These conditions are believed to give Santa Catarina a predisposition to better absorb the potentialities of public policies. The analysis in this chapter consists of: a short discussion of PNAE, an analysis of the relative success of the policy in various municipalities, and the identification of the potentialities of PNAE as evidenced by its effects on farmers (based on interviews with 98 key actors conducted in 2015).

This chapter argues that food purchasing under PNAE has the potential to empower farmers, encourage farmers' organization and enable farmers to access other, formal markets. In addition, it argues that the purchasing of family farming products may contribute to the building of sustainable food systems by boost environmental biodiversity, protecting local cultures and supporting the fight against social inequalities.

8.2 Sustainable food systems: literature review

Food systems and denied unsustainability

Academia has historically separated natural and socio-economic aspects; nature was understood as an inexhaustible source of resources for the generation of value, an external factor that could be shaped to the needs of the world population. However, this misconception started to change at the end of the twentieth century as the adverse ecological and social effects of this view of agrifood development became increasingly evident. At the beginning of the twenty-first century, the food system was identified as one of the major causes of the depletion of natural resources and of poverty and food insecurity (Willett *et al.*, 2019). The recognition of the limits that nature imposes upon human activity implies the recognition of the relationship between human actions and environmental degradation, climate change and global warming, and awareness of the unequal use of the remaining resources. This recognition reflects the increasingly evident limits of appropriation and legitimation in the dominant model, as well as the fertile foundations for alternatives to be constructed (Marsden, 2018). However, evidence of the shortcomings of the dominant production model and its governance structures, and the emergence of alternative movements does not necessarily result in transformative changes. Indeed, the narrative around the dominant model persists (Marsden, Moragues-Faus and Sonnino, 2018). This persistence reflects a denial that shows itself in two ways: resistance and adaptation. Unsustainability is denied or underestimated, while the demand for sustainability is addressed through incremental adaptation, including the appropriation of precepts from emerging alternative markets. Labels attesting to organic production methods, fair trade or other concepts of sustainability and other actions are similar to the greening strategies used for conventional products, and do not question prevailing production models (Galli *et al.*, 2018). The persistence of the traditional narrative is justified based on the proposition that there is a trade-off between food diversity and quality and the preservation of the environment on the one hand, and sufficient food supplies on the other. In this thinking, the dominant food system and its agricultural model is considered as the only one capable of feeding the world. Hence, policymakers and consumers are presented with an impossible dilemma – the choice between two aspects that are essential to the future of humanity.

Many argue that the world produces enough food. Rather than producing greater quantities, the focus should be on ensuring that the food produced is of the right type and quality, production practices are sustainable and food is distributed equitably. The fundamental questions here are: How can we use the resources we have in a more just, effective and sustainable way? How can we at the same time produce food, protect wildlife and provide adequate livelihoods for rural populations? What would be the results of a better coordination of the use of resources by food producing communities? (Royal Society for the Encouragement of Arts, Manufactures and Commerce, 2019).

In recent decades, alternative food movements and networks have begun to seek answers to these fundamental questions; they show that it is possible to meet the demands for food security and sustainability, and at the same time connect urban and rural populations. Throughout the world, sustainable forms of production and consumption are being developed – especially in Latin America, which plays a pioneering role in agroecology. Other strategies are the expansion of markets for products of organic, agroecological agriculture and the strengthening of short marketing chains (Rover, 2011). These alternative movements and systems create new spatial and social connections in response to the concentration and centralization of capital in the agrifood sector, and to the peripheralization of food inequalities and poverty by the dismantling of social and food welfare networks. The new paradigm conceptualizes inequality in food and income as wasteful, and judges the current agricultural model to be inadequate (Marsden and Morley, 2014). Effective sustainable (socially, economically and environmentally) food systems are based on local needs and local inputs (such as culture and agrobiodiversity) and promote socially balanced and inclusive development.

The new paradigm of food sustainability focuses on food insecurity; it responds to social and spatial inequalities by empowering rural producers, implementing local development strategies and constructing conditions that ensure resilience within the system (Marsden, Moragues-Faus and Sonnino, 2018). According to this paradigm, the new agricultural model is local, innovative, biologically diverse and agroecological (Francis *et al.*, 2003), and relies on family labour (FAO, 2014). In other words, it is an alternative model centred around small family farmers that is socially, economically and environmentally sustainable (FAO, 2014).

The following sections discuss sustainable food systems and analyse the contribution that family farmers can make to the building of such systems.

Sustainable food systems

How can we use the resources we have in more just, effective and sustainable ways? The new paradigm of sustainability in food systems places food security at the centre of this discussion. This paradigm goes beyond strictly environmental aspects to tackle fundamental social and economic questions about the sustenance of human life, the safeguarding of human health, etc., and the interrelation between them.

Sustainability has been measured in terms of concepts such as water footprints or carbon emissions; however, these often obscure the complexities of sustainability. It is not enough to ensure low carbon emissions or water footprints if doing so results in other forms of unsustainability. Likewise, it may not be recommendable to use carbon emission levels or footprint criteria in food deserts, food-insecure regions or regions that do not have favourable conditions to produce food.[1] The debate around sustainable food systems and food security must overcome such limiting concepts (Marsden and Morley, 2014). Indeed, in some places, the building of a sustainable food production system requires a lot of time, while in other places it may be discovered that it is more sustainable to buy globally than locally. Such places need a more comprehensive understanding of sustainability. Looking at the larger picture may help formulate more complex and complete strategies.

Marsden and Morley (2014) define a sustainable food system using six parameters. First, a sustainable food system ensures that "economic development and environmental efficiency and protection are integrated in planning and implementation." Second, it aims at "reducing the effects of unsustainability on the young and future generations." Third, it guarantees "environmental biodiversity protection and restoration." Fourth, it is "equity maximizing" and "entropy minimizing." Fifth, it is based on "the quality of life and sustainable well-being." Sixth, it has "inclusive and multi-stakeholder capabilities and commitments for developmental and business models that are more

[1] Food deserts are deprived areas with poor access to retail provision of healthy affordable food (Whelan *et al.*, 2002). Food-insecure regions are regions whose food insecurity places them on the hunger map.

than business as usual, and ones that enhance the multiple territorial capitals of different places." Meanwhile, Caron *et al*. (2018, p. 4) state that:

> *Sustainable food systems may contribute to four outcomes: (i) enabling all people to eat nutritious and healthy diets, (ii) regenerating ecosystems, (iii) mitigating climate change, and (iv) encouraging social justice through focusing on the resilience and well-being of more impoverished rural communities.*

FAO argues that a sustainable food system, and more specifically sustainable agriculture, requires a greater efficiency in the use of resources and direct actions to conserve, protect and improve natural resources; it implies protecting and improving rural livelihoods, promoting equity and social well-being, and boosting the resilience of individuals, communities and ecosystems (FAO, 2014). The report of the High Level Panel of Experts on Food Security and Nutrition (HLPE) (2017) highlights the importance of resilience to external shocks (including climate variability, natural disasters and economic shocks) and of a more diverse food supply that provides diversified and high quality foods. The report also underlines that policies aimed at building sustainable food systems must focus on environmental as well as nutritional and health aspects. It states that while the short-term costs of actions may seem high, "the cost of inaction is much higher, carrying with it a terrible legacy affecting future generations" (HLPE, 2017).

Sustainable food systems can make significant contributions to society in two ways. First, they may alleviate the problems arising from the traditional food production model of the Green Revolution. Second, they may help solve diet-related problems in terms of the access to and quality of food, as well as health (e.g. obesity and diabetes). Sustainable food systems connect consumers with local rural and urban farmers. The recognition of this connection does not imply the assumption that foods sourced locally through alternative, local food networks only have positive aspects (Sonnino, 2010). The reconnection between consumers and local producers, and even between producers and the landscape and nature they engage with, is seen as an opportunity to restart the discussion about food systems – and especially about the value given to short and alternative food chains. This renewed discussion includes the topic of how to deal with uneven development within and between regions, and takes into consideration the marginalization of farmers and the loss

of value of their operations. It questions the centrality of capital in conventional agriculture, the biotechnology industry and the agro-industry (Marsden, Moragues-Faus and Sonnino, 2018).

According to the United Nations (UN), "a sustainable food system is a food system that delivers food and nutrition security 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" (UN, Secretary General's High Level Task Force on Global Food and Nutrition Security [HLTF], 2015). According to Lindgren *et al*. (2018), sustainable food systems may enable a shift towards healthier, affordable and sustainable diets. The authors address various issues of sustainable food systems, including food waste reduction and interactions between food and industrial systems. They discuss dietary transitions and emerging innovations from a perspective that links health and sustainability – in other words – that connects aspects of production with aspects of consumption.

The transformations that are necessary to achieve a sustainable agrifood system are determined by political will, social organization and local production conditions, among many other factors. More specific and localized studies are needed to understand transformations in agrifood systems.

The next section focuses on a group of farmers considered to be directly connected to the local dimension of sustainability in food systems: family farmers.

Family farming and its potential to contribute to the building of sustainable food systems

There are various definitions of family farming, or family-based agriculture. Some definitions mention family management and labour, and emphasize a predominantly agricultural income (HLPE, 2013). Family-based agriculture does not guarantee the sustainability or nutritiousness of food. Nevertheless, family farming has the potential to be a tool for rural development that can engender socio-economic and environmental progress (Garner and de la O Campos, 2014). Family farming has resisted the concentration and centralization of production to continue supplying diversified products to different markets. As such, its very existence demonstrates that it is an alternative to the traditional agricultural model.

Family farming and its role in sustainable food systems can be understood through concepts such as embeddedness (Murdoch, Marsden and Bank, 2000), resistance (O'Brien, 2013; Scott, 1985), resilience (Folke, 2006) and redesign (Oostindie, 2015). A rural property and farming not only signify work, but they also mean home, food, health, community, culture and a way of life to a family farmer. The environment and socio-agrobiodiversity are part of family farmers' production systems; hence, it is in their direct interest to preserve them by using resources efficiently and promoting biodiversity. Family farming is at the forefront of organic and agroecological production, especially in Latin America where agroecology takes the form of a social movement among family farmers.

Food systems are complex and closely linked to place. They include connections between family farmers, neighbours and local consumers based on trust. Associations, cooperatives and other types of organizations empower farmers to overcome the disadvantages of their limited scale of production in terms of market power, access to assets and political representation. Family farmers usually source labour and resources for investment within their local communities, and typically market their products through short marketing circuits i.e. most of their trading is done close to consumers, often within their own communities (HLPE, 2013). The close connection between family farmers and their communities decreases dependence on the market economy. This provides local protection by boosting family farmers' resistance to shocks such as economic crises.

Family farmers' connection with the land and the environment makes them potential actors for the preservation of traditional food products, global agrobiodiversity and natural resources (FAO, 2014). Furthermore, family farming has been found to be associated with reduced malnutrition and food insecurity (FAO, International Fund for Agricultural Development [IFAD] and World Food Programme [WFP], 2015). In late 2017, FAO released a resolution launching the Decade of Family Agriculture (2018–2028) (FAO, 2019). This resolution emphasizes the importance of family farming for food security and nutrition improvement, as well as for the eradication of poverty and the conservation of historical, cultural and natural heritage.

Family farmers produce and consume healthy foods through biodiverse production systems that are integrated in the local environment and community. Note that there may be trade-offs between ensuring that family farmers play a central role in the building of sustainable food systems and short-term profitability (Marsden, Moragues-Faus and Sonnino, 2018).

Section 3 discusses the public purchasing of products from family farmers as a way to improve the sustainability of food systems in the Brazilian state of Santa Catarina.

8.3 Family farming and its potential contribution to the building of sustainable food systems: the case of Santa Catarina

The State of Santa Catarina

The Brazilian State of Santa Catarina can be considered a family farming state, where "the family is the central nucleus of a way of producing and living that has consolidated the state's dynamic and diversified agriculture" (Ferrari and Marcondes, 2015, p. 7). Family farming is very present in Santa Catarina in terms of the number of farms, the area under production and production value. Family farms account for 78 percent of all rural properties in the state (Brazil, Brazilian Institute of Geography and Statistics [IBGE], 2019).[2] Family farmers in Santa Catarina stand out politically and economically. Their political participation is high, and they are generally recognized as strategically important from both an economic and a political point of view (Marcondes, 2016). The farmers are used to adopting new technologies and market mechanisms, and they are well integrated in both national and international markets, especially for meat. The strong presence of family farming in Santa Catarina has its roots in the early colonization of the territory. This part of the Brazilian South was not at that time suitable for the large-scale production of products with a high commercial value such as sugar, cotton or coffee (Burque de Holanda, 1984).

[2] Although family farms make up nearly 77 percent of Brazil's 5.1 million agricultural enterprises, they account for only 23 percent of the total income generated by the agriculture sector, and occupy only 23 percent of the land (Brazil, IBGE, 2019).

Thus, the territory was colonized by granting possession of small properties to immigrants through colonization companies.[3] These small, diversified operations set up cooperatives and developed an agro-industry to serve other Brazilian states. They laid the basis for enduring local economic systems and traditions (Mattei and Nunes Lins, 2010).

Family farming only lost relative importance in Santa Catarina at the end of the twentieth century, with the late arrival of agricultural modernization and the commercial opening up of the territory through neoliberal policies that changed the rules of the food market. The late arrival of modernization was due first to the geography of the State (with irregular and varied soil conditions, that could not easily be adapted to mechanization); second, family farmers in the State, through organizations such as cooperatives and thanks to their political clout, successfully created an environment that was hostile to agricultural modernization. Third, modernization was hampered by the fact that family farmers are flexible and can react to market pressures by changing their production methods in times of crisis; in addition, family farmers are often engaged in labour-intensive, rather than capital-intensive, activities (Marcondes, 2016).

As a result of the late modernization of agriculture in the State, the transformation towards the concentration of production and income also started late; agricultural production in Santa Catarina is still not dominated by the production of raw materials for export markets – as is typical for Brazil as a whole, where a structural transformation towards a decrease in the number of family farmers and an increase in the size of properties has taken place (Ferrari and Marcondes, 2015; Marcondes, 2016). Indeed, agricultural production in Brazil as a whole is becoming more intensive, with a growing use of agrochemicals; an increasing share of the land is being used for the production of soybean. This trend is resulting in the exclusion of less competitive family farmers. However, family farmers in Santa Catarina are still resistant to these trends, which facilitates the implementation of public support policies. As pressure on family farmers in the state increases, such policies must be strengthened.

[3] The central government's main interest in the region was to use it a transit and supply route.

Analysis of the contribution of PNAE to the building of a sustainable food system

Overview

Public procurement can promote a shift towards more sustainable agriculture. Sonnino, Spayde and Ashe (2016) argue that public purchasing schemes (e.g. school meal programmes) can use alternative food systems and create new forms of governance. Public procurement can foster short food chains and reformulate relationships between farmers and institutional buyers by prioritizing nutritious and ecologically sustainable foods from smaller-scale and/or organic producers.

PNAE was created in 1955 as part of the Brazilian institutional purchasing system. It became a tool for rural development, sustainability and food security in 2009.[4] Since then, the actors involved in PNAE – the country's 27 federative units, 5 570 municipalities and all state schools – have been required to use at least 30 percent of all federal resources under the programme to buy products from family farmers.[5] In addition, foods should be purchased, whenever possible, within the federative unit where the schools are located; organic or "agroecological" foods should be prioritized.[6] Thus, PNAE seeks to distribute food from more sustainable agrifood systems. In addition, the resolution gives preference to local, vulnerable producers. For purchases from family farmers, preference is given to (in this order) local suppliers within the municipality, agrarian reform settlements, traditional indigenous communities and quilombos,[7] suppliers of certified organic or "agroecological" foods, formal groups of family farmers, informal groups of family farmers and individual family farmers.[8]

The regulations relating to the purchasing of food from family farmers under PNAE can be considered a success. The regulations were issued in 2009, and in 2011 (year of the first available data), 8 percent of the federal resources for school meals were

[4] The original law on PNAE dates from 2009, but has been improved over time. The most recent version is the law issued in 2013 (*Resolução/CD/FNDE nº 26 de 17 de junho de 2013* [Resolution/CD/FNDE No. 26 of 17 June 2013]).

[5] A price premium of up to 30 percent is tolerated for organic and/or agroecological products.

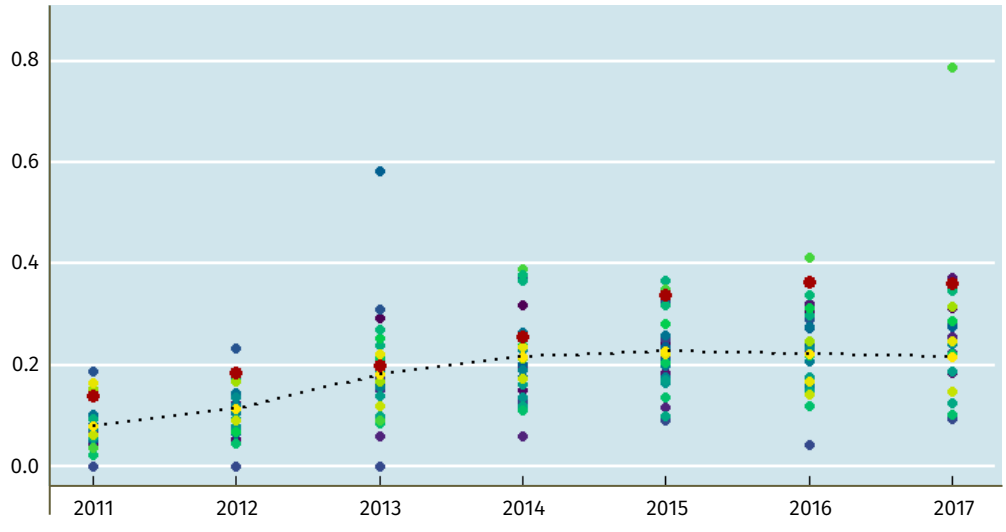
[6] *Resolução/CD/FNDE nº 26 de 17 de junho de 2013* (Resolution/CD/FNDE No. 26 of 17 June 2013) (Article 19).

[7] Quilombos are hinterland settlements founded by people of African origin.

[8] *Resolução/CD/FNDE nº 26 de 17 de junho de 2013* (Resolution/CD/FNDE No. 26 of 17 June 2013) (Article 25).

used to purchase family farming products.[9] In 2015, the share of funds spent on food from family farms reached 22.8 percent;[10] it remained at a similar level in 2016 and 2017 (Figure 1).

Figure 1 **Funds used to buy food from family farmers, as a share of total federal funds available under PNAE to States and municipalities, 2011–2017**



Source: Brazil, Ministry of Education, National Fund for Educational Development (FNDE), 2019.

Although the national average share does comply with the requirement of 30 percent set by the law, several Brazilian states have shown consistent progress towards this goal.

Analysis

PNAE succeeded in boosting the share of food from family farms in overall purchases in Santa Catarina; the results differ, however, from municipality to municipality. Principal component analysis (PCA) was used to measure the degree of success of PNAE by comparing a number of variables before and after implementation of the

[9] BRL 234.7 million or USD 74.54 million (in December 2017, BRL 3.2805 = USD 1).

[10] BRL 858.6 million or USD 261.73 million (in December 2017, BRL 3.2805 = USD 1).

policy (Johnson and Whichern, 2007).[11] The following variables were evaluated for the municipalities in Santa Catarina:

- **horticulture:** number of horticultural establishments (per capita);
- **association:** number of associated establishments (per capita);
- **technical assistance:** number of establishments with access to technical assistance (per capita);
- **PNAE:** value (BRL) of purchases of family farming products (per capita).

Due to the large differences in size between the municipalities of the state, the absolute variables were divided by the number of inhabitants in corresponding municipalities, to obtain per capita values.[12] In addition, the municipalities were divided into two groups: "small" (up to 10 000 inhabitants) and "medium and large" (over 10 000 inhabitants).

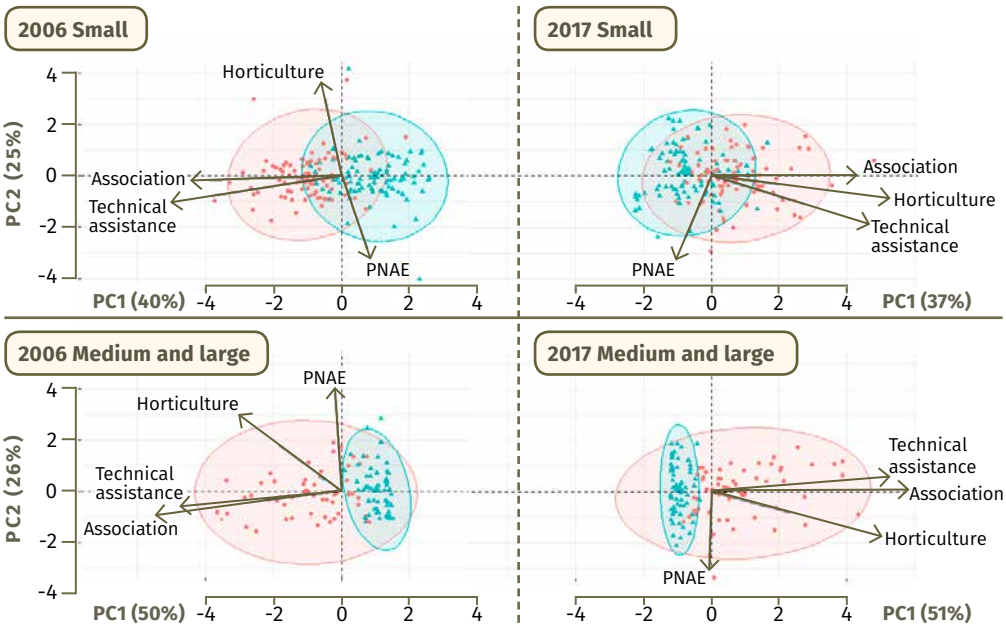
The PCA analysis generated four biplot graphs (Figure 2), one for each group of municipalities and each selected year (2006 and 2017); the dots are the various municipalities of Santa Catarina. The municipalities were analysed for the years 2006 (before implementation of the policy) and 2017 (after implementation), according to the availability of data from IBGE. The variables were selected based on the availability of literature and data. The selected variables are:

- the value of purchases of family farming products under PNAE (PNAE);
- the participation of farmers in associations, reflecting the organization capacity of farmers (association);
- access to technical assistance, reflecting public support and the private availability of farmer support (technical assistance); and
- the production of fruits and vegetables, the dominating product category in the purchases of family farming products for school feeding (horticulture).

[11] This multivariate methodology seeks to evaluate the variance and covariance structure of a random vector composed of random p-variables by constructing linear combinations of the original variables.

[12] The transformation was made because the analysis of the absolute values may have generated a mistaken image due to the differences in size between the municipalities.

Figure 2. **Analysis of the municipalities of Santa Catarina according to selected variables before (2006) and after (2017) the implementation of PNAE, by population size group and by year**



Notes: blue dots: municipalities with the lowest number of family farmers (lower median); red dots: municipalities with the highest number of family farmers (upper median).

Source: Brazil, Ministry of Education, FNDE, 2019; Brazil, IBGE, 2019.

The municipalities classified as small are characterized by a large number of associations and technical assistance bodies (2006 and 2017). These municipalities have more producers of horticultural products in 2017 than in 2006. In 2017, a larger number of red municipalities are located near the axis of the PNAE variable. This shows that in 2017, municipalities with the most family farms are also those with the highest family farming purchases.

As far as the medium and large municipalities are concerned, red municipalities remain practically identical between 2006 and 2017 in terms of the number of associations, technical assistance and horticultural production. For this group, the purchasing values of family farming products are more concentrated in 2017 (less scattered blue dots, closer to the axis of the PNAE variable as well as the number of red dots).

The increase in purchases of family farming products over time, and the emphasis on horticultural products led to an increase in purchases of organic products under PNAE.[13] Indeed, under the programme, organic foods began to be served in schools. According to data from the accountability management system (SiGPC) of the National Fund for Educational Development (FNDE), Santa Catarina spent USD 1 070 368 to purchase organic products for school meals in 2017.[14]

In Brazil, organic and/or agroecological products can be marketed through three alternative mechanisms. An audit may be carried out by a certifying body accredited by the Ministry of Agriculture, Livestock and Supply (MAPA), a participatory guarantee system may be certified by a legally recognized participatory conformity assessment body (OPAC), or a direct selling organization under social control can declare its products organic, if it follows the specifications of a technical commission. The accreditation system for organic production has created new instruments to favour small producers (Brazil, MAPA, n.d.). For example, as the institutional market is configured as direct selling, farmers can use social control. Participatory certification has also been used by groups in a way that promotes greater interaction between farmers, consumers, technicians and other stakeholders.

The importance of the connection between farmers and support mechanisms (technical assistance and associations) to the success of PNAE is apparent for both groups of municipalities, and for both time periods analysed (see also Chapter 29). However, more horticultural producers and family farmers sold to PNAE throughout the years in small municipalities. In medium and large municipalities, the purchasing values of family farming products were more concentrated in 2017. These results may imply that incentives to diversify production should focus on smaller municipalities; however, most of the financial resources are concentrated in medium and large municipalities. The results validate strategies that support organic and "agroecological" production methods and promote the inclusion of historically more vulnerable groups of farmers.

The following section complements this discussion with qualitative information.

[13] It was impossible to analyse organic products separately through PCA as the number of organic producers is too small and organic production is not sufficiently formalized, which hinders a more precise dimensioning.

[14] BRL 3 510 625 (in December 2017, BRL 3.2805 = USD 1).

Understanding the potentialities of PNAE

Caron *et al.* (2018), Marsden and Morley (2014) and FAO (2014) build different but fully compatible concepts of sustainable food systems. The various concepts have three principles in common. First, they share a concern for the environment, the efficient use of its resources and biodiversity, the regeneration of ecosystems and the mitigation of climate change. Second, they consider present and future generations; equity is guaranteed and basic needs are satisfied with an emphasis on food security and quality of life i.e. all people (and especially the most vulnerable, rural populations) should eat nutritious and healthy diets. Third, the two previous aspects are contemplated while taking into consideration the needs of individuals, communities and ecosystems; social justice is promoted with a focus on resilience and well-being, especially for poorer rural communities. The food system, in terms of sustainability, is thus perceived as complex and closely linked to place.

The next paragraphs analyse the effects of PNAE in Santa Catarina based on 98 interviews with key actors, conducted in 2015. They consider the three central points highlighted above. The interviewees included family farmers, representatives of municipalities responsible for purchasing from family farms, and rural extension employees from EPAGRI, the agricultural research and rural extension agency of the state of Santa Catarina.

Keeping the three principles of sustainable food systems in mind, PNAE improved family farmers' relationships with the environment, food security and quality of life, and resilience in five ways:

- The interviewed actors universally confirmed the positive impact of PNAE purchases on farmers' incomes. "Guaranteed income" and "guaranteed purchases" were mentioned as the main advantages of the programme.
- The most often mentioned advantage of PNAE is the higher quality and diversity of food that thousands of children, teenagers, farmers and their communities receive on their plates. In 80 percent of all municipalities, the interviewees highlighted an increase in product diversity, which is linked to biodiversity (see also Chapters 5, 11 and 12). In some municipalities, respondents mentioned the use of regional products and fish in school meals (some of this fish is

purchased from a women's cooperative).[15] PNAE's aim to boost the diversity of foods is related to the aim of preserving biodiversity. The greater diversity in food production resulted in a higher availability of food for farmers and meals with a higher nutritional diversity for students, their families and communities. The strengthening of farmers' livelihood capacities was highlighted as one of the primary positive outcomes of the policy in the municipality of Bom Retiro, even though there was no specific question on this topic.

- Family farmers, their family and communities cited local development, increased local production and the encouragement of young people to stay in the countryside as positive effects of PNAE. They also mentioned intangible aspects, such as the preservation of the history of family farming, the promotion of family farming and the improvement of farmers' well-being.
- PNAE guarantees purchases for a relatively long period (usually one year). Hence, farmers feel encouraged to make small investments in their enterprises, such as expanding production or increasing their product range, building greenhouses or adopting plasticulture.
- The previous four effects, together with the support from municipalities and the state, encourage farmers to organize themselves formally to take advantage of PNAE. By doing so, they can access other, previously inaccessible markets.

8.4 Conclusions

The new paradigm of sustainable food systems presents a possibility to overcome the limits of the hegemonic narrative that presents the current – unsustainable – agricultural model as the only alternative for the production of food. By overcoming these limits, answers can be sought to the most challenging questions, including how to produce sufficient quantities of healthy foods accessible to the population as a whole in a sustainable way.

This chapter discussed the potential of family farming to help answer this question, as well as the related challenges. Family farming, while not necessarily sustainable, has the potential to improve the diversity of food production, strengthen the

[15] The regional products included pine nuts (*pinhão*), jaboticaba (the fruit of the Brazilian grapetree) and carambola fruits.

relationships between producers and consumers and foster connections with local cultures and biodiversity. The achievement of these goals requires the development of a new narrative around sustainable food systems. In addition to this narrative, strategies must be developed to attract farmers to forms of production that are more economically, socially and environmentally sustainable.

To analyse the potential of family farming, this chapter used the example of the State of Santa Catarina where family farming has a strong presence, but is under pressure. The analysis of the performance of PNAE in Santa Catarina revealed differences between small and medium and large municipalities. Horticulture, used as a proxy for the production of fresh and diverse foods, showed most changes in small municipalities after the implementation of PNAE. Smaller municipalities were found to be more sensitive to change over time. The changes in horticulture (e.g. production diversification) found through PCA were corroborated by qualitative data. Both the quantitative and the qualitative analyses found evidence of an increase in purchases of food from family farmers.

Future research should look into the local technical, personal, organizational and other factors that promote change towards more sustainable agrifood systems. Who/what promotes such change, and why? Do the factors stem from the pressures on the traditional model of the Green Revolution? Could an agroecological transition be stimulated? Has PNAE led states and municipalities to change their policies for food and nutrition security, rural and environmental development in a way that supports the building of sustainable food systems from a sustainable production to encouraging healthier eating habits?

It is recommendable to follow up on the proposal of family farming as a sustainable production model with an analysis of existing and potential agricultural knowledge patterns. Changes in these patterns over time may explain possible permanent changes in the behaviour of family farmers. Public policies should aim at boosting the resilience and sustainability of family farms.

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9 CHALLENGES AND OPPORTUNITIES FOR RURAL WOMEN IN PUBLIC PURCHASING PROGRAMMES: CASE STUDIES IN LATIN AMERICA AND THE CARIBBEAN

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ABSTRACT

This chapter assesses women's participation in a number of public food procurement initiatives in six Latin America and Caribbean countries (Brazil, Colombia, the Dominican Republic, Honduras, Paraguay and Peru) based on the results of field research. It addresses the opportunities and difficulties that women face when trying to participate in such initiatives as producers and sellers. Women's participation in most of the programmes was found to be very low, except in Brazil, where measures were taken to increase their involvement. The Brazilian case shows that doing so improves the quality and diversity of the food consumed in schools and social facilities. This chapter formulates recommendations as to how governments can facilitate the participation of women in public food procurement programmes, and thus fight hunger and malnutrition without reinforcing gender inequalities.

9.1 Introduction

Over the past decades, public food purchasing programmes began being recognized as instruments that enable states to honour commitments in terms of food security as a human right, improve the lives of their poorest citizens and promote local development. Using their sizable purchasing power, states can stimulate the production, sale and consumption of food products in the socially, environmentally

and economically most advantageous way (Latin American and Caribbean Economic System [SELA], 2014). Public purchasing programmes that favour family farming may boost the incomes of producers, increase the supply of fresh, varied products on the market, and help people eat healthier diets.[1]

A number of public purchasing programmes have been implemented in recent years in Latin America and the Caribbean, generally by progressive governments and often supported by international aid programmes or by the Food and Agriculture Organization of the UN (FAO) (FAO, 2015a; FAO, 2016). Public purchases have been used under a variety of government-led programmes to supply food to public institutions such as schools, hospitals, prisons or the armed forces, or to vulnerable populations (through public canteens, food supplementation programmes, the distribution of basic food packages, etc.).

The first such programme was the Food Purchase Programme (Programa de Aquisição de Alimentos, or PAA) created in 2003 in Brazil, under the auspices of the federal government's food and nutrition security policy. PAA established a direct purchasing mechanism that bought food directly from small family farmers or their organizations. This food was distributed to people facing food insecurity through the social assistance network, including school meals (Menezes, Porto and Grisa, 2005; Chmielewska and Souza, 2010. See also Chapters 2, 8, 10, 11, 12, 14, 15 and 16 for additional analysis of the Brazilian experience). Similar, more or less institutionalized programmes soon followed in other countries (Cintrão, 2018).

Evaluations of these efforts have demonstrated their potential to create virtuous cycles linking the promotion of family farming to the improvement of the functioning of local markets, the provision of social assistance and the furthering of consumers' well-being (Ballesteros, 2015; Chmielewska and Souza, 2010; FAO, 2013, 2015a, 2017; Maluf *et al.*, 2015). In short, these programmes produce numerous social benefits and help address the causes of hunger and poverty in urban and rural areas alike.

[1] Beginning in the 1990s, numerous countries in Latin America saw the emergence of public policies dedicated to family farming. The term was eventually legally defined, taking into account factors such as the engagement of workers from outside the family, the size of enterprises and the use of land. However, family farmers remain a very heterogenous category in terms of socio-economic and cultural characteristics. Farmers may have adopted more or less modern techniques; they may belong to traditional or indigenous communities, descend from African ancestors, etc. Differences among family farmers are not always duly considered in policy design, whether they are differences in family composition (gender or age, for example) or in the access to land and capital resources, in ways of life, in production methods, in the access to natural resources, etc. Salcedo and Guzmán (2014) trace the history of family farming as a category and offer a panoramic view of its complexity.

While public purchasing initiatives open up new possibilities for rural women, many obstacles may hinder their involvement as direct providers in the programmes. Gender inequalities arise at the personal, family and – most importantly – institutional levels (Quisumbing *et al*., 2014; Siliprandi and Cintrão, 2015). These inequalities create significant hurdles to women's full participation in the programmes, as they affect the ways in which women see themselves and are seen by others as rural producers, as women, and as members of a family or community (Siliprandi and Cintrão, 2011a). Treating women equally to men (i.e. without distinction, as if they enjoyed equal opportunities or as if their work were complementarily to that of men) in public purchasing programmes only reinforces existing inequalities.

International agreements on gender issues have, in many countries, promoted the creation of agencies that collect statistical data and implement plans and policies on gender equality.[2] However, these plans and policies do not always pay specific attention to the issued faced by rural women, as highlighted by rural women's groups. The inclusion of rural women in public purchasing programmes is not just a matter of social justice and gender equality, but may bring tangible benefits.

This chapter demonstrates the potential contribution of rural women to public purchasing programmes, and identifies the factors that hamper their full participation in them. In particular, the chapter emphasizes that programmes must take due account of the causes of gender inequalities and help resolve gender gaps.

The chapter is based on two research studies. The first study was undertaken in 2009 and 2010 in Brazil, and examines the participation of women in PAA (Siliprandi and Cintrão, 2011a, 2011b, 2013).[3] The second study was led by FAO's Regional Office for Latin America and the Caribbean. It analyses women's inclusion in public purchasing (trial) programmes (mostly school feeding programmes) in Colombia, the Dominican Republic, Honduras, Paraguay and Peru (Cintrão, 2018).[4] School feeding programmes

[2] See, for example, the *United Nations Convention on the Elimination of All Forms of Discrimination Against Women* (1979). Beginning in the second half of the 1990s, many countries formulated national plans to ensure equal opportunities for women and created institutions (ministries, secretariats, national institutes, directorates, etc.) to drive policymaking and implement actions for gender equity (See Cintrão, 2018, pp. 8–9, Table 1 and Table 2).

[3] This mixed-methods research studied the formal presence of women as PAA contract-holders to identify the factors that facilitated or hampered their participation.

[4] See the list of initiatives studied in Table 1. Beyond documenting women's participation in the various programmes, the study delivered recommendations to improve their inclusion in the programmes.

grew significantly in the 2000s in Latin America and the Caribbean as an instrument to universalize the access to food through decentralized purchasing programmes with guaranteed public resources (FAO, 2013, 2015b). Most school food programmes offer breakfast or snacks, but some also offer lunches. Some try to source most of the food served nationally, preferably from the areas closest to the place of consumption (see Chapters 6 and 17 for additional studies on Honduras and Peru, Chapters 17 and 28 for Colombia and Chapter 17 for the Dominican Republic and Paraguay). Efforts have been made to include rural women as suppliers in these programmes, but they remain incipient (Cintrão, 2018).

9.2 Rural women and gender inequalities

The rural population of Latin America and the Caribbean is estimated at roughly 129 million people. They are peasants, indigenous people and Afro-descendants; they have different ways of life and social organization and carry out a range livelihood activities, from growing crops and raising animals to gathering wild plants or fishing – in addition to the non-agricultural tasks that continue to define rural life.

Women work in the productive and reproductive spheres (i.e. caring for their families); however, they face explicit and implicit discrimination when trying to access production resources (e.g. land) and services (Quisumbing *et al*., 2014). They commonly work without pay on family plots, and, when they hold jobs elsewhere, are more likely than men to find themselves in temporary, seasonal and badly paid positions (Nobre *et al*., 2017; Cintrão and Siliprandi, 2011; Siliprandi and Cintrão, 2015).

Because women's rural work often goes unrecognized, their labour is excluded from the statistics and their contribution to the economy cannot be calculated. The contribution of women to food security, the protection of biodiversity and the preservation of agroecological practices is often ignored. In agriculture, women prepare land for planting, care for animals, fish, gather wood, collect water and process, transport and sell food; in their families and communities, they prepare meals or care for children and the sick (among many other tasks). However, women's work in agriculture is considered part of the reproductive sphere and, as such, is unremunerated. Women's contributions are seen as little more than helping the (male) head of the household, and as part and parcel of women's roles as wives and mothers (Nobre *et al*., 2017; Cintrão and Siliprandi, 2011).

Women in agriculture earn, on average, 40 percent less than men. Those who do not earn an income of their own are dependent on men (i.e. their fathers or husbands). This puts them in a position of extreme vulnerability, including to abuse and violence. At the same time, they often find themselves without adequate social security instruments, including pensions, income support, etc. (Nobre *et al.*, 2017). Furthermore, many services essential to improving agricultural production, such as the provision of technical and financial assistance, are often not extended to rural women as they are considered to be unable to run a farm, at least on their own (Cintrão and Siliprandi, 2011; Siliprandi, 2015). Banks, rural extension companies, non-governmental organizations (NGOs) and government representatives often recognize only men when it comes to making finance- or work-related decisions; this hinders women's efforts to earn better incomes on their own and decrease their dependency on their male family members. Likewise, women rarely participate in the forums and councils that discuss matters of rural development and public policy. Such platforms are usually reserved for men, who are seen as the rightful representatives of their families (Cintrão and Siliprandi, 2011; Siliprandi, 2015; Siliprandi and Cintrão, 2015).

Against this background, public food purchasing programmes may foster the inclusion of women in the economic-productive system and help ensure that their work is remunerated fairly. Indeed, the guaranteed outlet, and thus income, provided by such programmes may help women climb out of poverty, improve food security for themselves and their families, and boost their personal autonomy.

9.3 The involvement of women as suppliers in public purchasing programmes: case studies

The context: public purchasing programmes and rural women' organizations

National public purchasing systems are usually hard to access for small producers, rural and urban alike. Even though some countries have created laws and mechanisms to favour the participation of micro-, small and medium enterprises (SMEs), the logic of participation in such schemes remains the same (SELA, 2014). Complex registration and participation procedures, as well as the large quantities demanded and the

delivery conditions imposed, all work against the participation of small suppliers, which remains very marginal (Cintrão, 2018). In systems such as these, there is almost no possibility for rural women to become suppliers. Among other reasons, rural women's life and work do not follow a corporate logic. Their organizations tend to be small and informal – that is, off the books (Cintrão, 2018; Siliprandi and Cintrão, 2011a, 2011b).[5] Many rural women do not even have civil documents (Nobre *et al*., 2017).

Efforts to increase the participation of rural women in public procurement schemes are usually part of food security policies; they rely on direct purchases from family farmers and use non-standard procedures to simplify the requirements imposed by standard public procurement legislation (FAO, 2015a, 2015b, 2017). Some of the initiatives studied, though useful to demonstrate the potential of public purchasing programmes to stimulate local development, operated on a very small scale and ultimately could not be continued, scaled up or consolidated.[6] In all the countries studied, conventional purchasing modalities (such as open tenders, public auctions, etc.) continue to prevail. This results in systems defined by high-volume contracts and dominated by wholesalers and large producers (generally urban ones), with limited participation by family farmers (at least as direct providers) and even less of women.[7] Programmes to boost public purchasing from family farmers are usually disconnected from programmes that aim to promote equality for rural women, and therefore fail to include mechanisms to promote women's participation in purchasing schemes. Where women do manage to participate, positive impacts on those women and on the programmes can be observed. A number of examples of how women's participation can be boosted are highlighted below.

Table 1 lists the programmes and the cases studied in the research on which this chapter is based. They were chosen for their potential to improve the involvement of rural women.

[5] A study of SMEs participating in public purchasing programmes in the Dominican Republic found that businesses run by (urban) women are smaller than those of men, and that their activities are generally linked to the home (Escuder, 2016).

[6] See, for example, the cases of Peru, Colombia and Paraguay, where some initiatives, while successful, did not survive due to changes in government (at the national, state or local level), local disputes or a lack of interest of successive actors (Cintrão, 2018). In Brazil, the PAA budget grew between 2003 and 2016 but after that all but disappeared due to political changes.

[7] Though often justified on the basis of logistical reasons, purchasing quantities continue to be too large to enable the direct participation of family farmers or rural women's organizations (which are generally small and informal) (Cintrão, 2018).

Table 1 **Cases studied by Cintrão (2018) and Siliprandi and Cintrão (2011a, 2011b, 2013)**

COUNTRY	PURCHASING PROGRAMMES AND CASE STUDIES
BRAZIL	Programme: PAA or *Programa de Aquisição de Alimentos* (food purchase programme), a programme of the federal government. Case study*: the PAA component "purchasing with simultaneous donation" (no-bid contract buying of local food products from family farming organizations to use in social programmes (e.g. to complement school food programmes). Simultaneously promotes food access and local food production through direct purchasing. Launched in 2003, considerable reduction in size after 2016.
COLOMBIA	Programme: PAE or Programa de Alimentación Escolar (school food programme) and food purchasing by the Instituto Colombiano de Bienestar Familiar (ICBF) (Colombian institute for family well-being). Case studies**: ▪ Food and Nutrition Improvement Plan of Antioquia (MANA), supported by FAO (2013–2015): supply of food to the PAE and ICBF to promote the inclusion of local family farming products in public purchasing schemes for basic food packages; and ▪ Mesoamerica Without Hunger (Mesoamérica Sin Hambre) in Boyacá (2007–present): aims to include family farmers as food suppliers for PAE and ICBF.
DOMINICAN REPUBLIC	Programme: PAE or Programa de Alimentación Escolar (national school food programme). Case study**: pilot project to strengthen public purchasing from local family farmers, one of the programmes linked to efforts to reduce poverty and hunger, including PAE Sostenible (Programa de Alimentación Escolar Sostenible - Sustainable School Food Programme) and Mesoamerica Sin Hambre (Mesoamerica Without Hunger)
HONDURAS	Programme: PAE or Programa de Alimentación Escolar (national school food programme). Case study**: FAO-led pilot programme to include local purchasing in municipal programmes (2012– present) in the Mosquitia region, Gracias a Dios Department, under an agreement between PAE and the World Food Programme (WFP) (2001–present).
PARAGUAY	Programme: PAE or Programa de Alimentación Escolar (national school food programme). Case studies**: ▪ simplified process for the acquisition of agricultural and fishery products from family farmers – direct purchasing modality (2013–present, applied in all purchasing programmes); and ▪ simplified process for the acquisition of agricultural and fishery products from family farmers – indirect purchasing modality (2015–present, applied only under PAE).
PERU	Programme: Qali Warma, Programa de Alimentación Escolar (national school food programme). Case study**: FAO-led pilot project for purchasing from family farmers in the Junín region (2016) under the Strengthening School Food Programme (2012–present).

Sources: *: Siliprandi and Cintrão (2011a, 2011b, 2013) and **: Cintrão (2018).

None of the countries studied had developed guidelines, requirements or actions specifically directed towards rural women's inclusion as producers in public food purchasing programmes.[8] Indeed, it proved difficult to even obtain structured data on the participation of rural women, since some programmes did not record the gender of their suppliers. The lack of data on the potential of women to participate in public purchasing programmes demonstrates the invisibility of women's contributions to the agriculture sector (Cintrão, 2018).

Among the initiatives studied, those with the highest levels of women's participation were the PAA component "purchasing with simultaneous donation" in Brazil and the local purchasing scheme for school food programmes in the Mosquitia region of Honduras.

Rural women's participation in PAA (Brazil)

Women were largely invisible in the data on Brazil's PAA. Although the programme's files showed that women accounted for only 27 percent of all purchasing contracts at the national level, fieldwork suggested that women were actually involved in at least 60 percent (and in some cases, 100 percent) of all activities related to the production of food sold to the programme (Siliprandi and Cintrão, 2011a, 2013).

The high actual levels of women's participation in PAA may be attributed to a number of factors. Procurement was decentralized, with little bureaucracy involved. Suppliers could deliver small quantities or instalments, and received a fair price promptly. PAA valued the regionality of food and promoted the conservation of biodiversity, which stimulated the acquisition of locally produced food items. The programme accepted a wide variety of products, which enabled the purchasing of many items produced by women, including fresh products (roots and tubers, fruits, vegetables, eggs, etc.) and processed foods made with local ingredients (such as breads, biscuits, cakes, different kinds of flour, candies, jams, fruit pulp, etc.).

[8] Only the Dominican Republic has implemented an affirmative action policy to boost women's participation in public purchasing programmes (this policy is not specific to rural areas). It set a minimum quota for the involvement of SMEs, which led to an increase in the participation of urban businesses headed by women (Escuder, 2016).

The fact that women's names did not appear in the contracts can be attributed mainly to institutional discrimination by public servants and officers – not to mention the legal instruments themselves – who consider it normal to list women's husbands as contract holders, since they are the heads of the household. Not having contracts in their own names entails a series of disadvantages for women. First, it reinforces their invisibility as rural producers and the lack of recognition as productive economic actors – that is, it depreciates their work. Second, it reinforces women's lack of personal and economic independence; in many cases, women had little direct access to sales revenues, which were deposited into the accounts of their husbands or delivered directly to them in cash.

In 2011, pressure from rural women's movements and technicians from the Ministry of Agrarian Development over the coordination of the programme led to the creation of quotas i.e. minimum numbers and values for contracts awarded to women, in an effort to increase women's participation. To fulfil these quotas, it was necessary to ensure that contracts could be signed in women's names or that family documents included both partners' names; in addition, efforts were made to raise gender awareness among public officials (Siliprandi and Cintrão, 2011a).[9]

Rural women's participation in PAE (Honduras)

Women noticeably participated in the pilot programme to include local purchasing in Honduras' Programa de Alimentación Escolar (PAE, national school food programme) in the Mosquitia region (Andino and Cintrão, 2018; Cintrão, 2018). The local programme supplier was the Asociación de Mujeres Indígenas Misquitas or association of indigenous Miskito women, an organization with 1 500 members, 80 percent of whom are women. This association supplied fresh food to 56 schools, serving more than 5 000 children in two municipalities. PAE regulations stipulated that school food supplies must be purchased within the region from associations, farmers' cooperatives and agro-industrial cooperatives (Cintrão, 2018) (see Chapters 6 and 17 for additional analysis of Honduras' experience). Regulations and procurement

[9] A similar example comes from Paraguay, where the Ministry of Women supported the generation of statistics on rural women and took measures to ensure that land documentation included the names of women. However, national documents and records for family agriculture still carry only the name of the head of the household, usually the man (Cintrão, 2018).

guidelines were adapted to local realities, drawing upon the experiences of local actors. The list of prices and products to be supplied were defined jointly by the association, local producers and government agencies in meetings and field visits. Products changed seasonally, and a fair pricing scheme was developed on the basis of real local costs. Contracts were signed with each individual woman producer, and payments were made once every two weeks. The programme also made technical assistance and mentoring opportunities available to the women.

Requirements for becoming a provider were simplified: only an identity document, a national tax registration number and a receipt were requested. Organizations were required to submit documentation of their bylaws, legal status, national tax registration and receipts. Each organization had to supply a certain number of schools, with a total supply requirement that corresponded to their production capacity, product line and geographic location. Parents of schoolchildren had to supply and prepare the food, to ensure that the products used for their children's meals were of good quality. Among the fresh products that women producers supplied were tubers (yucca, taro), fish, seafood, eggs, dairy products, various types of bananas, vegetables and fruit for juice (lemons or an alternative, in-season choice). The national government, in cooperation with the World Food Programme (WFP), supported the local purchasing scheme; this helped achieve the programme's eventual inclusion in national purchasing legislation. The involvement of women's organizations, NGOs, and gender-focused international aid projects ensured an active, visible presence of women in the programme.

In 2014, the initiative was expanded thanks to the support of the Secretary for Development and Social Inclusion. By 2017, the model was being implemented in 103 municipalities and 3 800 schools, reaching 35 percent of all students nationwide. As part of the expansion, the schools' rations of dry staples (corn, beans and rice) were complemented with fresh, locally produced products, according to a region's supply base; women play an important role in the production of such foods.

It is worth emphasizing that the public purchasing process and operation of the Honduran PAE is fairly simple, with few administrative requirements or hygiene standards. This simplicity has made it relatively easy for small producers and women with low incomes to participate.

Women's contributions to programmes

Brazil's PAA provides an excellent example of the potential of the inclusion of women to increase the diversity of food in public purchasing programmes. Under PAA, 300 different products were purchased across the nation, with regional differences that reflected local food cultures.

Products considered as "women's products" are often those produced close to the home, and not through commercial farming. Women on family farms are mainly responsible for the production of foods associated with self-sufficiency, subsistence or "the back yard"; many of these foods are rooted in local eating habits. Women raise small animals, keep hens for eggs, cultivate gardens, collect wild foods and fish. Some of these products have been marginalized in the larger food economy; their inclusion in public purchasing programmes diversifies the offer, boosts consumers' appreciation for them and helps preserve biodiversity (Siliprandi and Cintrão, 2011a, 2013).

Some foods included in the purchasing programme (e.g. chicken meat and eggs, vegetables, wild foods such as fruits and chestnuts, fish and shellfish) used to be sold by women prior to the programme's launch, but usually on a smaller scale. Other products used to be exchanged with neighbours or given as gifts, or simply left untouched in the field. The opportunity to sell these products to a public purchasing programme helped valorize the work of women who produced them and strengthen their economic independence. At the same time, it also helped valorize the products themselves. PAA purchased ecologically produced foods – usually produced by women – at a 30 percent markup. Thus, it helped to promote and valorize these products as well.

In some cases, the public purchasing programme helped create new markets (or revive old ones) for products that families had stopped selling due to a lack of demand. The increasing visibility and popularity of these products allowed women to find new outlets at local fairs and markets (Siliprandi and Cintrão, 2011a, 2013).

9.4 Major obstacles and challenges to improving women's participation

The study of the cases revealed a number of factors that may promote or discourage the participation of women in public purchasing programmes. This section identifies the most important ones. Some factors relate to the design and operation of the programmes themselves, while others are linked to the institutional discrimination of women and the success – or failure – of policymaking in countering this discrimination.

Factors related to the rules of purchasing schemes

National public purchasing programmes are generally designed to work with large-scale commercial producers. Their minimum supply requirements, complex procedures, low prices offered and late payment terms often hinder the participation of small farmers – whether men or women. The recognition of the potential of public procurement as a tool for development has led governments to simplify contracting modalities for small farmers by stipulating less burdensome bureaucratic procedures as an exception to the ordinary regulations (FAO, 2015a, 2015b; SELA, 2014; Escuder, 2016). It goes for all the analysed cases that whenever rural women were able to participate in public purchasing programmes, this was largely due to a revision of specifications and regulations to facilitate the inclusion of small family farmers. However, even with these revisions, the effective inclusion of women as direct suppliers was still very difficult. Rural and indigenous women are usually involved in informal and communal types of production. Their organizations are small and have few resources, and production is often seasonal. All of these elements make it hard for them to engage in formal commercial operations (Cintrão, 2008). In some of the cases studied (e.g. Paraguay, Peru and Honduras), informal arrangements based on mutual trust eased women's inclusion in purchasing programmes. A better understanding and the legal recognition of such arrangements may help boost women's participation (Cintrão, 2008).

In addition, gender-focused actions are needed to overcome an institutional culture in which public officials automatically consider the family as a collective unit, with the husband as the head of the household and the sole producer. All documents related to family-based agriculture should be revised to incorporate both partners'

full information, as was done in Brazil's PAA and in the land titling programme in Paraguay (Siliprandi and Cintrão, 2011a, 2011b).[10]

The size of purchase contracts should be revised to allow for sales of products in smaller quantities by rural women. It is commonly argued that women do not participate in public purchasing programmes because they lack the production capacity to meet requirements for high volumes and steady supplies. However, if the potential of women as producers is recognized and they are to be included in purchasing programmes, the reasoning should be the opposite: contracts should be revised to permit smaller, more local purchasing. This has been confirmed by this study. The most successful cases in terms of women's participation are those programmes that considered women's production volumes prior to stipulating the items and quantities to be purchased, as in the cases of the PAE in Honduras (Cintrão, 2018; Andino and Cintrão, 2018) and the PAA in Brazil (Siliprandi and Cintrão, 2013). Women's production capacities were also taken into account in purchasing decisions for a number of individual rural schools, canteens and hospitals in the Dominican Republic, Paraguay and Peru (Cintrão, 2018).

The examples of PAA in Brazil and of smaller initiatives in Honduras, Peru and Paraguay show that facilitating participation in public purchasing programmes by lowering minimum volume requirements, offering fair prices and guaranteeing a long-term market can stimulate farmers to better structure their production activities and increase their output. Indeed, smallholders' low production volumes often result from a lack of market access – not the other way round (Siliprandi and Cintrão, 2013; Cintrão, 2018).

Another important set of factors are prices, payment schedules and forms of payment. To allow women to participate, payment terms cannot be overly lengthy, and payments cannot be subject to delays. Women producers (either as independent suppliers or as members of an association) face economic circumstances that necessitate a fast and reliable return on investment.[11] Prices must be fair and reflect the quality of the products, which are often natural and artisanal and hence cannot be compared to standardized industrial products.

[10] In Brazil, it is now mandatory to have both partners' names in family agriculture records; it is no longer permitted to name a single contract holder. In addition, both Brazil and Paraguay have taken measures to include the wife's name on land titles.

[11] A study of SMEs led by urban women in the Dominican Republic also demonstrated the importance of this factor (Escuder, 2016).

The composition of menus and the selection of products to be purchased are other factors that can help rural women participate in public purchasing programmes. The more diversified the demand, the more possibilities there are for women to participate. If school food programmes offer not only breakfast and snacks but also lunches, for example, there are more possibilities to include foods produced by women. Unfortunately, in the countries studied, the lingering legacy of international food aid programmes means that breakfasts and snacks continue to comprise mainly industrial dairy-based beverages and wheat-based foods such as crackers and cookies. Indeed, studies of the milk and stock formation programmes under Brazil's PAA (Siliprandi and Cintrão, 2011a) and of the Instituto Hondureño de Mercadeo Agricola (IHMA, Honduran agricultural market institute) and Vaso de Leche (glass of milk) programmes in Honduras (Cintrão, 2018) demonstrate that it is much more difficult for women to participate in supply chains for certain products – such as milk and grains – than for others.

It is essential to better understand the difficulties and opportunities that each particular supply chain poses for women producers, from region to region. In Brazil, for example, who is responsible for production varies from region to region, and from product to product. Some types of production are mainly entrusted to men, with women's contributions considered mere helping, while other types of production are primarily the responsibility of women (Siliprandi and Cintrão, 2013).

To ensure that menus reflect local production realities, women should be included in menu planning from the start, beginning with the choice of the products to be purchased. The case of the region of La Mosquitia in Honduras is instructive in this respect (Cintrão, 2018).

Research into how to increase the demand and supply of locally sourced foods produced by family farms generally fails to apply any sort of gender perspective, and usually considers only so-called commercial products. As a result, little is known about products produced by women, women's participation in agriculture or women's role in self-sufficiency or food security (Cintrão, 2018). To remedy the invisibility of rural women's labour, surveys must include questions related to the division of labour in agriculture (e.g. recording each person's gender, together with their responsibilities in agricultural activities). This will boost the recognition of women's capacities for

agricultural production and help find new ways to include them in purchasing programmes (Nobre *et al.*, 2017; Quisumbing *et al.*, 2014).

A final factor to be considered is the compatibility of hygiene regulations, quality assurance measures and food safety standards with local production realities. In several of the countries studied, the existence of stringent hygiene standards and the assumption that products from rural and indigenous women cannot not meet them, were commonly used to explain women's low participation in public purchasing programmes.[12] Hygiene regulations generally require small producers to adapt their production practices to industrial processes and standards. Indeed, these requirements are often formulated for export-oriented, large-scale productions, whose sanitary risks are very different from those of small, artisanal producers. As such, hygiene regulations become another obstacle impeding smallholders from participating in the public purchasing market.[13]

Structural factors and gender inequality

Deeply rooted gender inequalities affect rural women's access to resources (e.g. land or credit) and services that are essential for production. This hampers women's efforts to become independent, productive agents and participate in public purchasing programmes (Nobre *et al.*, 2017; Quisumbing *et al.*, 2014).

Access to markets is crucial to women's economic autonomy. Pilot programmes that successfully integrated women producers in public purchasing programmes were appreciated by the women involved precisely because they guaranteed a long-term income. This finding demonstrates that public purchasing programmes have the potential to reduce social and economic inequality (Cintrão, 2018; Siliprandi and Cintrão, 2011a).

[12] Hygiene certifications require compliance with a set of specifications related to processing, storage and transportation, and record-keeping thereof. These requirements are often defined by international rules, such as those of the Codex Alimentarius, that focus on industrial, large-scale productions. An association of women producers in Peru that was analysed for this study had to implement a hazard analysis and critical control points (HACCP) system for their production of homemade quinoa noodles for the local school food programme (Cintrão, 2018).

[13] Cintrão (2017) critically discusses the lack of differentiation in hygiene standards for different scales of food production.

The initiatives studied in Brazil, Colombia, Honduras and Peru show that women's involvement in public purchasing programmes improves when those women are members of women-only groups. In groups with both men and women, women frequently found themselves relegated to secondary roles, performing unpaid tasks or administrative duties rather than managerial ones. Participation in women-only groups helped them overcome personal and family obstacles and surmount their lack of experience as they faced the challenges inherent in the commercialization of their products (Cintrão, 2018; Siliprandi and Cintrão, 2011a, 2011b)

Actions that support and promote direct sales by women's organizations in other markets can help women gain and strengthen the skills needed for accessing public purchasing markets. In Paraguay, for example, women's participation in market fairs and their involvement in associations of fair vendors facilitated the introduction of women's products in the school food programme (Cintrão, 2018).

Affirmative action policies setting minimum quotas for contracts awarded to women (as in Brazil's PAA and the Dominican Republic's PAE) highlight existing inequalities and open new paths to increase women's participation (Cintrão, 2018, Siliprandi and Cintrão, 2011a). Applying such policies requires unrelenting efforts by women's movements and other involved actors; it often also requires significant changes in the design and operation of the programmes and their related policies (i.e. as regards land titles, registration, access to services, etc.).

The case studies show that efforts to create opportunities for women to participate in public purchasing programmes must be accompanied by strategies that promote social and cultural change and allow for the real and effective empowerment of rural women (Cintrão, 2018).

The adoption of an across-the-board gender perspective in the formulation of public policies requires special competencies. Well-informed and trained government officers must take the lead, in collaboration with representatives from women's organizations and movements from across the span of public policies. Policymakers must ensure, however, that women's involvement in policymaking does not become another burden that women must face in order to gain access to resources (for example, several of the programmes studied required participants to take on such

duties as unpaid voluntary work).[14] It is necessary to keep in mind the dynamic relationships that exist between the worlds of paid work (on the formal and informal labour market) and unpaid work (domestic and community work, broadly understood). There must be spaces to debate and reflect upon emerging changes in the subjective dimension of women's lives.

9.5 Conclusion

The cases presented in this chapter show that major challenges continue to stand in the way of efforts to fully include rural and indigenous women as providers in public purchasing programmes; there is still a long way to go. Despite advances in gender and equality policies and the emergence of concrete initiatives to promote the involvement of rural women, overall public policymaking for rural areas still fails to incorporate a gender perspective.

This situation adds to the barriers faced by rural and indigenous women as they attempt to negotiate public policies; it reinforces existing patterns of discrimination and anchors a model of rural development that overvalues productivity and fails to recognize women's contribution to food and nutrition security.

Increasing women's participation requires that rural women's distinct realities – including the structural inequality that defines and shapes the rural context – are taken into account from the first steps in the design of policies. The continued use of gender-neutral regulations means that, in practice, women continue to be excluded as beneficiaries of rural policies.

The economic and cultural discrimination to which rural women are subjected by their families is reflected in the difficulty they have to express themselves successfully in the public sphere. This leads to a vicious cycle of non-rights and non-citizenship that ends, in too many cases, with women's non-participation; hence the continuing gender inequality in rural development projects. Women in general, and poor women

[14] Vizcarra (2008), for example, draws attention to the risk that food security policies imply a new burden of work for poor women, who are now charged with implementing the programmes but also remain responsible for the typical tasks of rural women (i.e. domestic and reproductive work).

in particular, are subjected to systemic, cultural and political processes that affect their capacity to act publicly and exercise their rights.

Public policies can help improve the lives of women by recognizing their valuable contribution to society and helping them overcome prejudices and social values that hinder their full identification as citizens. Public policies must be designed taking into account these questions if they are to liberate men and women alike from poverty.

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10 PUBLIC FOOD PROCUREMENT AND INDIGENOUS PEOPLES: THE CASE OF THE BRAZILIAN NATIONAL SCHOOL FEEDING PROGRAMME

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ABSTRACT

This chapter aims to explore the potential benefits of the institutional food market of school feeding for indigenous peoples in Brazil, highlighting achievements, challenges and possible ways forward. Indigenous people are introduced in this chapter in view of the 2030 Agenda for Sustainable Development's conceptual framework to determine who is left behind. Aspects of Brazil's School Feeding Programme (PNAE) related to indigenous peoples' issues will be highlighted, showing their potential to generate multiple benefits in social, cultural and environmental areas. Finally, this chapter will address the barriers to the productive insertion of indigenous peoples in PNAE and the institutional alternatives that have been developed at the national level for its improvement.

10.1 Introduction

The 2030 Agenda for Sustainable Development seeks to benefit everyone; it commits to leave no one behind by reaching out to all people in need and deprivation, wherever they are. The United Nations Member States pledged to "endeavour to reach the furthest behind first" (United Nations Development Programme [UNDP], 2018).

Across countries, indigenous peoples, ethnic and linguistic minorities are disproportionately present among those left behind (UNDP, 2018). Indigenous peoples

are among the planet's most vulnerable and marginalised populations (Kuhnlein *et al.*, 2006). They have lower living standards, a lower life expectancy and higher rates of maternal and child mortality, malnutrition and infectious diseases than the general population (United Nations Economic Commission for Latin America and the Caribbean [ECLAC], 2015).

In Brazil, indigenous peoples suffer great health inequalities when compared to other members of society. They live in poor sanitary conditions and face severe food insecurity (Coimbra, 2014). Since 2003, the country has designed and implemented several highly innovative multisectoral platforms and policy instruments to enhance food security that focus on smallholder farmers, with priority being given to indigenous peoples and other traditional communities (Grisa *et al.*, 2011).

The Brazilian National School Feeding Programme (PNAE) has been given utmost importance in the Government's agenda upon being incorporated into this set of policies and programmes. It is currently recognized as one of the largest institutional procurement programmes in the world (Soares *et al.*, 2013). Productive inclusion of smallholders is a challenge under these policies, which aim, among other objectives, at reaching the poorest and most needy producers (Swensson, 2015) (see Chapters 2, 8, 9, 11, 12, 14, 15 and 16 for additional analysis of the PNAE experience in Brazil).

Indigenous peoples are considered a priority group under the PNAE, both as food consumers and as suppliers. However, there is a marked gap in the technical, administrative and scientific knowledge about their productive inclusion under the programme. This chapter tries to help fill this gap by analysing the opportunities and challenges faced by indigenous people with respect to their inclusion in PNAE.

10.2 Indigenous peoples and the Brazilian National School Feeding Programme (PNAE)

Brazil was officially removed by the Food and Agriculture Organization of the United Nations (FAO) from its Hunger Map in 2014 (Mattheisen *et al.*, 2019). The country has gained international recognition over the past decade for its successful fight against hunger and food insecurity under the Zero Hunger Strategy and associated public policies and programmes (Santarelli, 2015).

Implemented by the Brazilian government in 2003, this strategy was recognized as a model by the FAO and the World Food Programme (WFP) in the fight against hunger and poverty (Fraundorfer, 2013). Its associated inclusive economic and social development actions have helped strengthen smallholder production, improve access to food through various social protection measures and foster inclusive rural development (Hunter *et al.*, 2016).

PNAE has made a significant contribution to the success of these initiatives, mainly due to its design, which prioritizes access to food, income generation and productive inclusion. The programme is developed and implemented under the umbrella of the Government's food and nutrition security policy, and stems from the right to food as enshrined in the Brazilian Constitution. Brazil was the first country to integrate the link between school feeding and agricultural production into its regulations. PNAE is currently the country's most important food and nutrition security programme (Hawkes *et al.*, 2016).

In 2020, PNAE was given a budget of USD 1.03 billion,[1] to be used to purchase food for 42 million students.[2] At least 30 percent of expenditures for the purchasing of products for school meals at all three levels of government (municipal, state and federal) must be on purchases from local smallholder farmers. This creates a potential institutional market of at least USD 309 million in local purchases.[3] In 2018, the programme served 255 888 indigenous students in 3 345 schools.[4] Of these, 98 percent were located in rural areas (Brazilian National Institute for Educational Studies and Research, 2019).

PNAE regulations require that school meals respect the local culture. This provision is particularly important for indigenous peoples, as food production, preparation and distribution and consumption practices are relevant in the cosmology and social organization of these peoples (Brazil, Federal Prosecution Service, 2017). Moreover, indigenous producers are given priority in the PNAE supply chain, together with land

1 Or BRL 4.15 billion, according to the exchange rate on 2 January 2020, the first day of budget execution in 2020.

2 As per school census data of the previous year.

3 BRL 1.24 billion (exchange rate on 2 January 2020).

4 As per the most recent data available.

reform settlers and quilombolas (*Lei N° 11.947, de 16 de Junho de 2009* [Law No. 11.947 of 16 June 2009]).[5]

There is extensive technical, administrative and scientific literature on the effects of PNAE on the general public. However, the literature is scarce when it comes to indigenous peoples. The particularities of PNAE as regards indigenous peoples, as both consumers and food suppliers, include *inter alia* the following:

- Respect for eating habits and culture has the potential benefit of offering indigenous students less industrialized meals that are more in line with their eating practices.
- Supporting sustainable development has the potential to encourage the purchasing of diversified, locally produced food from smallholder farmers, with priority being given to indigenous producers, among others.
- PNAE provides that indigenous peoples' representatives participate in its instruments of social participation, which allows them to express their needs and influence decision-making under the programme (Garnelo and Pontes, 2012; Martins *et al.*, 2008).
- PNAE transfers for the purchase of food for indigenous students are higher than those for non-indigenous students.[6] The former must also receive greater daily nutritional support when compared to non-indigenous students (*Resolução/CD/FNDE N° 26 de 17 de junho de 2013* [Resolution/CD/FNDE No. 26 of 17 June 2013]).[7] Such measures are based on the vulnerability of their health and nutritional situation (Giordani, Gil and Auzani, 2010).

[5] According to the Brazilian legislation (*Decreto N° 4.887/2003* [Decree No. 4.887/2003]), the remaining members of quilombola communities are ethnic and racial groups with their own historical past, characterized by specific territorial relations and with the assumption of black ancestry, related to the resistance of historical oppression.

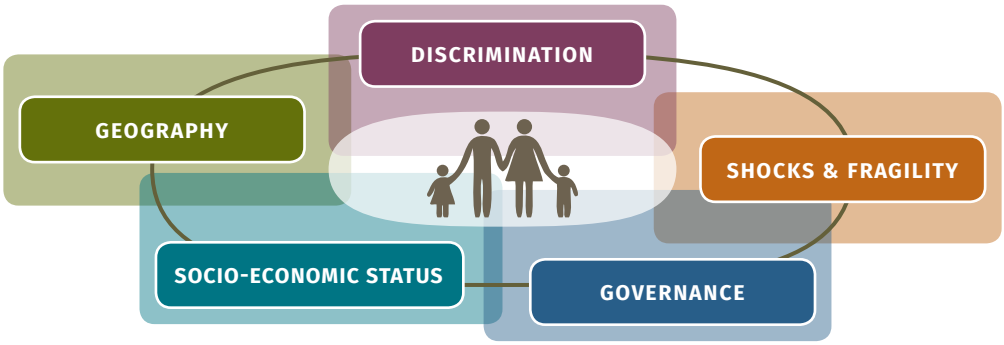
[6] According to the Brazilian legislation (*Resolução CD/FNDE/MEC N° 1, de 8 de fevereiro de 2017* [Resolution CD/FNDE/MEC N° 1 of 8 February 2017]), pupils enrolled in elementary schools located in indigenous areas or remaining quilombo communities receive BRL 0.64 (USD 0.16) per day from the federal Government. Day care pupils in indigenous areas or remaining quilombo communities receive BRL 1.07 (USD 0.27) per day. Other pupils receive BRL 0.36 (USD 0.09) if enrolled in elementary and high schools, and BRL 0.53 (USD 0.13) if enrolled in preschool (exchange rate on 2 February 2019). These transfers must be complemented by states and municipalities.

[7] According to the Brazilian legislation (Law No. 11.947 of 16 June 2009), each meal offered must meet at least 30 percent of the daily nutritional needs of pupils enrolled in schools located in indigenous areas. For indigenous and non-indigenous full-time day care pupils, at least 70 percent of the nutritional needs should be met. For non-indigenous students in elementary education, at least 20 percent of the nutritional needs must be met.

10.3 Indigenous peoples, public procurement and the Sustainable Development Goals (SDGs)

The 2030 Agenda's conceptual model of key factors (see Figure 1) makes it possible to determine who is left behind. In Brazil, all key factors affect indigenous populations simultaneously; as a result, they rank among the most severely disadvantaged populations.

Figure 1 **2030 Agenda's conceptual model of key factors**



Source: UNDP, 2018.

Food procurement policies hold considerable potential to deeply influence both food consumption and food production patterns and to deliver multiple social, economic, environmental, nutritional and health benefits (Lozano *et al.*, 2016). PNAE is groundbreaking in this respect as it delivers multiple benefits for multiple beneficiaries, including food consumers, food producers and local communities.

The productive inclusion promoted by PNAE is part of a mutually-reinforcing network of targets that can generate potential benefits in multiple areas relevant to indigenous populations (Le Blanc, 2015). The United Nations System Standing Committee on Nutrition considered PNAE as the most nutrition-sensitive policy in Brazil (Granheim, 2013).

An analysis of the objectives of the 2030 Agenda and PNAE's legal framework found a high degree of coherence between them. This means PNAE can potentially help

achieve the Sustainable Development Goals (SDGs) (Girardi, 2018). Table 1 was organized based on the SDGs and presents examples of potential benefits of PNAE for indigenous populations.

Table 1 **Potential benefits of PNAE for indigenous populations**

SDG	PNAE'S POTENTIAL BENEFITS FOR INDIGENOUS PEOPLES
 SDG 1 (no poverty)	PNAE is fundamental to understand Brazil's success in fighting poverty by targeting the most vulnerable groups. The programme supports smallholders by purchasing their products, giving priority to the most vulnerable ones (Granheim, 2013; Soares *et al.*, 2013), including indigenous populations. The programme includes social protection mechanisms (Vinci, Hani and Djeddah, 2016) which contribute to income security and social inclusion (FAO and WFP, 2018).
 SDG 2 (zero hunger)	PNAE mainly benefits students with a greater nutritional and socioeconomic vulnerability, focusing on school feeding as a means of promoting food security (WFP and International Policy Centre for Inclusive Growth, 2013). PNAE promotes the diversification of production (Soares *et al.*, 2013), which is reflected in the increased variety of fruits and vegetables served in schools (Sidaner, Balaban and Burlandy, 2013). In addition, purchases from local smallholders may indirectly improve households' food security (FAO and WFP, 2018). In case of environmental and climate-related disasters, communities can consume their own production; this reduces their vulnerability and makes the food system more resilient (Grisa and Schneider, 2008; Romanelli *et al.*, 2015).
 SDG 3 (good health and well-being)	The design of PNAE menus must consider health conditions, social vulnerability and local eating habits (Law No. 11.947 of 16 June 2009). In indigenous contexts, it is necessary to recognize the legitimacy of native knowledge, which includes the ways in which health and food and understood and dealt with (Leite, 2012). Given the increasing prevalence of chronic non-communicable diseases among these peoples, food and nutrition education offered under PNAE can be a strategy to fight these diseases in schools (Santos, 2010), as long as local contexts are considered (FAO *et al.*, 2018).
 SDG 4 (quality education)	As far as education is concerned, indigenous peoples in Brazil faces a series of cultural, political and institutional barriers that compromise student performance (Rangel, 2015). PNAE focuses on school feeding as a way to keep students enrolled and performing well at school (Soares *et al.*, 2013).
 SDG 10 (reduced inequalities)	School feeding programmes can help break the vicious cycle of discrimination against vulnerable groups (FAO and WFP, 2018). This issue is particularly sensitive for indigenous peoples in Brazil, as their cultures are the target of great discrimination.

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Table 1 <<<

SDG	PNAE'S POTENTIAL BENEFITS FOR INDIGENOUS PEOPLES
 SDG 12 (responsible consumption and production)	PNAE supports sustainable development. The programme prioritizes the most vulnerable producers, including indigenous peoples (Resolution/CD/FNDE No. 26 of 17 June 2013), using a smallholder-friendly procurement process (FAO and WFP, 2018). PNAE provides support to agroecological and organic producers and offers the possibility of purchasing "socio-biodiversity" products,[8] thus encouraging the sustainable management of natural resources (Beltrame *et al.*, 2016; FAO, 2012). Moreover, local purchasing reduces the environmental pollution generated by the packaging and transportation of meals to indigenous schools (Brazil, Federal Prosecution Service, 2017).
 SDG 17 (partnerships for the goals)	Brazil has shared its successful experiences with school feeding with other developing countries in Latin America, Africa and Asia by means of south-south cooperation (Santarelli, 2015). Most Latin American countries that have partnered with Brazil have indigenous populations.

Source: authors' elaboration.

10.4 Barriers to the productive inclusion of indigenous peoples in PNAE

The main challenges for the productive inclusion of smallholder farmers in PNAE are well documented; they can be summarized as follows (Bellinger, 2014; Lozano *et al.*, 2016):

- The public procurement process does not correspond to smallholders' technical and organizational capacities.
- Payments are often delayed.
- There are information gaps on the possibilities of productive inclusion under PNAE.
- Smallholders have difficulties to comply with sanitary standards for the marketing of certain products.
- The infrastructure, human resources and management skills needed to support production activities to meet different demands are lacking.

[8] Socio-biodiversity is a concept defined by the Brazilian legislation (*Portaria Interministerial MDA, MDS e MMA N° 239 de 21 de julho de 2009* [Interministerial Ordinance MDA, MDS and MMA No. 239 of 21 July 2009]) as "the relationship between biological diversity and diversity of socio-cultural systems," and socio-biodiversity products are "goods and services (final products, raw materials or benefits) generated from biodiversity resources, aiming at the development of production chains of interest to traditional communities and family farmers, that promote and valorize their practices and knowledge and ensure the sharing of benefits, thus generating income and promoting better quality of life and quality of the environment they live in." (Oliveira *et al.*, 2018).

The academic literature presents little data regarding the challenges faced by indigenous producers in the institutional market of PNAE, which must be added to the challenges described above.

Some of these constraints will be described below based on the five key factors of the 2030 Agenda's conceptual model. Various factors of vulnerability to which indigenous peoples are exposed, and how these factors are interrelated with the challenges to their productive insertion in PNAE, will also be highlighted (see Chapters 9, 16 and 17 for additional analysis on this topic, including in other Latin American school feeding programmes).

Discrimination

The structural discrimination that affects indigenous peoples, the impoverishment caused by the systematic expropriation of their territories, the loss of traditional ways of life, the obstacles to political participation and institutionalized racism have a strong negative impact on indigenous peoples' health (United Nations Economic Commission for Latin America and the Caribbean [ECLAC], 2015). In Brazil, this leads to higher morbidity and mortality coefficients than those registered at the national level, hunger and malnutrition, occupational risks and social violence (Coimbra and Santos, 2000).

Interethnic relations among indigenous peoples and PNAE staff members are unequal and marked by misunderstandings and prejudice (Gonçalves and Leite, 2016). Ethnocentric behaviour generates resistance against the purchasing of traditional food for school meals. One of the possible barriers to the inclusion of traditional indigenous foods in public purchasing is the negative perception of these foods among those responsible for implementing PNAE (Romanelli *et al.*, 2015).

Geography

Almost half of the indigenous population in Brazil (48.7 percent) lives in the Amazon region, mostly in remote and hardly accessible areas (Instituto Socioambiental [ISA], 2019), where physical isolation and social exclusion can be mutually reinforcing (International Federation of Red Cross and Red Crescent Societies [IFRC], 2018). Most of these peoples are concentrated on small plots of land and/or inhabit environments

that have been degraded by economic activities such as agriculture and mining. This situation limits the area where they live and grow food (Leite, 2007).

The great distances involved in the sending of food to these communities imply enormous costs; the transportation also generates significant pollution (Brazil, Federal Prosecution Service, 2017). Many communities are in precarious sanitary conditions (Coimbra and Santos, 2000; Garnelo and Pontes, 2012). In addition, indigenous peoples face serious infrastructural problems when trying to sell their products.

In the Amazonian context, the long distances that indigenous producers need to travel to deliver food to schools and the precarious situation of the means of transportation are an additional barrier. Therefore, industrialized products with a long shelf life are favoured over fresh and perishable foods grown locally (Brazil, Federal Prosecution Service, 2017; Rangel, 2015).

Governance

The International Labour Organization (ILO) acknowledges the importance of the participation of indigenous peoples in the formulation, implementation and assessment of programmes that directly affect them (*Indigenous and Tribal Peoples Convention*, 1989). In Brazil, indigenous peoples are underrepresented at all governmental levels in the development and implementation of policies and programmes that target them. In many cases, existing instruments for social participation do not reflect their traditional forms of representation (De Castro *et al.*, 2014; Gonçalves and Leite, 2016; Langdon and Diehl, 2007).

The indigenous population represents some 0.4 percent of the Brazilian population. There are about 896 917 individuals who identify as indigenous in Brazil, divided in 305 ethnic groups that speak 274 different languages (Brazil, Brazilian Institute for Geography and Statistics, 2012). Historically, the Brazilian State has failed to understand the sociocultural contexts of the groups targeted by PNAE. Demographic and epidemiological data are lacking, and the knowledge about the food and the nutritional situation of indigenous peoples is limited (Leite, 2012; Leite *et al.*, 2007). This lack of reliable data makes it difficult to determine development priorities and target actions effectively (FAO, 2015).

Furthermore, there is a lack of nutritional information on the foods traditionally consumed by indigenous peoples, which makes it difficult to adapt PNAE menus to local cultural specificities. This results a decrease in the demand for these foods. The situation is aggravated by the lack of basic education and training of PNAE officials to work in indigenous contexts (Diehl and Follmann, 2014).

In addition to all these difficulties, Brazil's ongoing fiscal, institutional and political crisis has been undermining indigenous rights. The Brazilian federal foundation for Indian affairs or FUNAI, which protects and promotes the rights of indigenous peoples in the country, has been subjected to significant budget and personnel cuts, and land rights have been infringed upon (Fraser, 2019; Mattheisen *et al.*, 2019).

As far as the productive inclusion of indigenous peoples in PNAE is concerned, the little information available is particularly vague and inconsistent. For instance, data are not segmented by ethnicity or community. In addition, there are no documents in the PNAE legal framework that are sufficiently detailed to support its operation in indigenous contexts (Gonçalves and Leite, 2016).

Another challenge faced by indigenous people concerns their difficulty to access information on how to sell products to PNAE (Bellinger, 2014). Public tendering procedures for food procurement are not adapted to the different indigenous contexts (Brazil, Federal Prosecution Service, 2017). In addition, information about tenders is generally disseminated in the Portuguese language, and may not be fully understood. Cases where information is divulged in indigenous languages are very rare.

In addition to the difficulties of navigating food tendering procedures, indigenous farmers face obstacles to obtain a declaration of aptitude, a mechanism for the registration of family farmers under the Government's national programme to strengthen family farming or PRONAF (Programa Nacional de Fortalecimento da Agricultura Familiar) (Teixeira and Norder, 2015). Without this declaration, a smallholder farmer is off the radar of the programme and cannot benefit from government policies or access credit facilities (Nehring and McKay, 2013). The lack of appropriate, contextualized and qualified technical assistance for indigenous farmers is another important challenge (Bellinger, 2014; Swensson, 2015).

Moreover, sanitary regulations are complex; they lay down rules that traditional, artisanal and family-based food producers find difficult to access, understand and comply with. The current health system does not take into account local and regional realities (Brazil, Federal Prosecution Service, 2017; Brazil, Food and Nutrition Security National Council, 2018).

Finally, the budget that is available for each indigenous student is another barrier to the insertion of indigenous producers in the institutional market of PNAE. Although this budget is larger than that for non-indigenous students, it is too general and does not take due account of the immense diversity of indigenous situations. For example, for some communities in the Amazon that are difficult to access, the existing transfers are unrealistic and do not allow recipients to purchase food that is suited to their realities (Brazil, Federal Prosecution Service, 2017).

Socioeconomic status

Indigenous peoples often face extreme poverty in its multiple dimensions and with all its implications. As a result, they are among the most marginalized and vulnerable human populations. Brazil ranks second in Latin America in terms of extreme poverty among indigenous people, which is six times higher than that of other populations in the country (Angulo, Solano and Tamayo, 2018).[9]

Indigenous peoples worldwide have higher rates of maternal and child mortality, malnutrition and infectious diseases. In Latin America, infant mortality among indigenous peoples is 60 times higher than among non-indigenous people (United Nations Inter-Agency Support Group on Indigenous Peoples' Issues, 2014). In Brazil, overweight and obesity are rapidly emerging among indigenous children and adults in parallel to this situation (Brazil, National Health Foundation, 2009; Coimbra, 2014; Welch *et al.*, 2009).

In terms of the inclusion of indigenous people in the productive system, there is no specific and differentiated national credit policy to support investments in indigenous agricultural or mining activities. There are no subsidies or tax exemptions that

[9] It is important to consider a number of reservations pointed out in the literature when classifying indigenous peoples as poor based on the rationale of the accumulation of goods in non-indigenous societies (Angulo, Solano and Tamayo, 2018).

encourage the strengthening of local indigenous productive arrangements (Brazil, Federal Prosecution Service, 2017); no policies encourage the selling of products by indigenous people in the formal market. In addition, various cultural and social problems prevent the State from recognizing and supporting the various forms of organization of productive life and labour relations among indigenous peoples (Brazil, FUNAI, 2017).

Shocks and fragility

Indigenous peoples, particularly those living in the most remote regions, are extremely vulnerable to climate change impacts due to their dependence on and interrelation with the environment and its biodiversity. Climate change worsens the difficulties that indigenous communities face (United Nations Department of Economic and Social Affairs [UN DESA], 2007). Agriculture and biodiversity are susceptible to climate change, which directly affects the livelihood and income of rural indigenous communities and increases their food insecurity (Kronik and Verner, 2010).

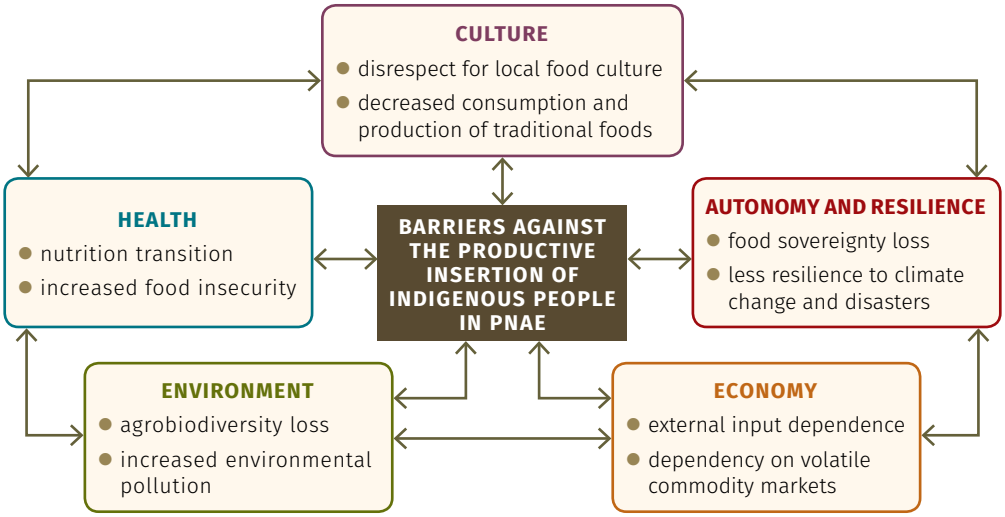
10.5 Barriers to the productive inclusion of indigenous peoples in PNAE: a vicious circle

PNAE has failed to prioritize the purchasing of food produced by indigenous people; the programme therefore needs adapting and improving to better address the needs of these peoples in the context of productive insertion (Bellinger, 2014). Data from the Food Purchase Programme (PAA) show that the participation of indigenous suppliers ranges from 0.014 percent to 2.25 percent of the total indigenous population, depending on the region (Teixeira and Norder, 2015).[10]

A number of barriers hinder the productive insertion of indigenous peoples in PNAE. These barriers are interconnected in complex ways, leading to a vicious circle. For purposes of clarification, this cycle can be divided into five thematic spheres: culture, autonomy and resilience, economy and environment, and health (see Figure 2).

[10] According to the Brazilian legislation (*Lei N° 10.696, de 2 de julho de 2003* [Law No. 10.696 of 2 July 2003]), the Brazilian Food Purchase Programme was created with three main objectives: help family farmers and rural entrepreneurs produce and access markets, distribute food to people with food and nutritional insecurity, and build up strategic stocks (Swensson, 2015).

Figure 2 **Barriers hindering the productive insertion of indigenous peoples in PNAE**



Source: authors' elaboration, inspired by Valencia, Wittman and Blesh (2019).

There are hundreds of records that show the absence or insufficiency of school meals in many indigenous schools (Brazil, Federal Prosecution Service, 2017; Rangel, 2015; Verdum, 2016) and the inadequacy between the food served and indigenous communities' eating habits (Brazil, Federal Prosecution Service, 2017; Giordani, Gil and Auzani, 2010; Gonçalves and Leite, 2016; Trujillo, 2012). Another frequently reported problem is the excessive supply of processed foods (Brazil, Federal Prosecution Service, 2017; Brazil, Food and Nutrition Security National Council, 2013).

The meals served by PNAE to many indigenous communities caused indigenous children to reject traditional foods and gradually abandon traditional farming practices (Brazil, Federal Prosecution Service, 2017). Lack of incentives for local production may increase indigenous communities' dependency on external food sources; this affects their ability to support themselves and hence poses a threat to their food sovereignty (Pimbert, 2009). Moreover, dependency on narrow-base food sources increases vulnerability in situations of extreme climate change, diseases and other threats (Sunderland, 2011).

Despite all efforts to the contrary (Lozano *et al.*, 2016), the share of socio-biodiversity products in public purchases under PNAE is very low (Girardi *et al.*, 2018). This contributes to the existing trend of the decreasing diversity of agrifood, the loss of food sovereignty and nutrition transition among indigenous peoples in Brazil (Sunderland, 2011). The excessive consumption of processed foods by indigenous students also leads to the accumulation of waste in indigenous communities, which do not have adequate ways to dispose of it. In the case of communities far from urban centres, shipping processed foods is costly and creates serious socio-environmental and health damage (Brazil, Federal Prosecution Service, 2017).

The vicious circle discussed in this section shows that the greater the vulnerability of a population, the more closely intertwined and harder to overcome the challenges become. Extreme inequalities are reinforced and perpetuated. Therefore, significant efforts and resources must be dedicated to surmount these obstacles (UNDP, 2018).

10.6 Conclusions

One of the greatest challenges to the productive insertion of indigenous peoples is that there is no blanket solution for doing so (Leite, 2007). Indeed, the impacts of PNAE must be evaluated in view of the socio-cultural characteristics of each ethnic group, their relationship with the state and the market, as well as their different conceptions of surplus production (food production beyond their own subsistence) (Dalonso *et al.*, 2016).

One of the most promising efforts of the Brazilian Government to improve the productive insertion of indigenous peoples in PNAE is based on the concept of self-consumption (Brazil, Federal Prosecution Service, 2017), whereby food grown by a community is purchased by PNAE for distribution and consumption within that community (Grisa and Schneider, 2008). This concept is based on the impossibility of dissociating production, preparation and consumption in indigenous contexts (Brazil, Federal Prosecution Service, 2017; Brazil, FUNAI, 2017).

Compliance with the guidelines on indigenous participation in deliberations about their productive insertion in PNAE is critical to increase the effectiveness of public actions (FAO, 2015). It is known that the indigenous right to free, prior and informed

consent is frequently violated within the scope of public policies (FAO *et al.*, 2018). Hence, it is crucial to guarantee the participation of indigenous peoples in policymaking that targets them (Garnelo and Pontes, 2012; Martins *et al.*, 2008).

In Brazil, recent cuts in funding and trimming of social programmes, including those for indigenous peoples, must be taken into account. Decontextualized academic information can be used inappropriately to justify such actions. Therefore, it is worth clarifying that this chapter argues that the productive inclusion of indigenous peoples in PNAE represents a significant social and political advance. The chapter has demonstrated the potential benefits of inclusion in PNAE for indigenous populations, thus justifying efforts to improve this inclusion.

Due to the lack of data on productive inclusion under PNAE, this chapter adopts a comparative and interdisciplinary perspective and relies on the conceptual approaches of another programme that works towards productive inclusion – the Food Purchase Programme. Given the prominence given to indigenous populations in the 2030 Agenda, it is crucial that international organizations and the Brazilian government join efforts to gain knowledge on the productive inclusion of indigenous populations.

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11 PUBLIC PROCUREMENT FOR FARMING SYSTEM DIVERSIFICATION

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ABSTRACT

Diversified farming systems have received considerable attention for their potential to contribute to environmentally sustainable and resilient food systems. This chapter discusses the potential of public procurement programmes in building public support for diversified farming systems. Focusing on Brazil's flagship public procurement programme, the National School Feeding Programme (PNAE, by its Portuguese acronym), this chapter analyses how public procurement may drive farm diversification and the adoption of agroecological practices among small-scale farmers. It also explores the limitations of public procurement programmes in promoting agrobiodiversity and agroecological practices, and potential ways for achieving broader impacts for environmental outcomes.

11.1 Introduction[1]

Diversified farming systems have received considerable attention for their potential to contribute to more environmentally sustainable and socially equitable food systems. Diversified farms can support greater biodiversity and multiple ecosystem functions such as soil nutrient cycling and enhanced nutrient retention, pest control and carbon sequestration (Power, 2010). Many diversified farms incorporate agroecological practices, exemplified by the use of ecological principles to inform management of plant diversity for ecosystem function, reducing or eliminating external inputs. Increasing plant diversity at farm and landscape scales, together with use of agroecological practices, can also reduce farmers' vulnerability to social and environmental risks by reducing the need for non-renewable inputs (Elser *et al.*, 2014) and contributing to food security and nutrition (Frison, Cherfas and Hodgkin, 2011). Despite growing evidence of their ecological and social advantages, diversified farming systems have received minimal public and private investment (Kremen and Miles, 2012; DeLonge, Miles, and Carlisle, 2015). As such, new analytical approaches are needed to assess food system interventions and policies that address the linked dynamics of food security and ecological sustainability (Wittman *et al.*, 2016).

Current market conditions, especially the consolidation of the global agrifood industry combined with a predominance of policies that favour industrialized agriculture, make it difficult for family farmers to thrive by maintaining diversified farming systems (Kremen, Iles and Bacon, 2012). In response, governments have developed new forms of public support for social-ecological services through targeted public food procurement programmes. Social-ecological services are the products and benefits derived from interactions between people and nature in social-ecological systems (Reyers *et al.*, 2013). Public procurement generates a "mediated market"

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that facilitates family farmers' preferential access to institutional markets for food produced under desired conditions (e.g. local, organic) (Wittman and Blesh, 2017; Guerra *et al*., 2017). Policies that create structured demand – i.e. large-scale, predictable demand generated by public or non-profit institutional food procurement – for a range of nutritious foods (e.g. vegetables, fruits, legumes, dairy products) may promote diversified farming systems by increasing their economic viability, while also supporting food security and nutrition (Nehring, Miranda and Howe, 2017). Structured demand is recognized for its potential to contribute to food security by reducing risks and vulnerabilities through increased productivity and ensuring reliable food supplies (International Policy Centre for Inclusive Growth [IPC-IG], 2013; Stefani *et al*., 2017). Important sources of structured demand for agricultural products include schools, hospitals, food reserves, the military and food aid programmes, such as the Purchase for Progress initiative of the World Food Programme of the United Nations (WFP, 2020).

Building on the need to identify policy designs that enhance food system resilience by supporting both food security and biodiversity (Wittman *et al*., 2016), this chapter reviews the relationships between participation in a specific public food procurement programme, the Brazilian National School Feeding Programme (PNAE, by its Portuguese acronym), and farm diversification. Farm diversification refers to management changes that result in an increase in both agrobiodiversity – the diversity in crop and livestock varieties and species – and the area of farmland under diversified production, as well as reductions in the application of synthetic inputs.

11.2 Farm diversification

Diversified farming systems maintain a diversity of organisms and functional traits that allow agroecosystems to sustain functions following disturbance (e.g. pest outbreaks or price fluctuations) (Matson *et al*., 1997; Wood *et al*., 2015). This diversity contributes to resilience, or the ability of a system to cope with shocks and external pressures, and to sustain the production of sufficient nutritious, culturally acceptable, and accessible food over time and space (Schipanski *et al*., 2016). Diversity of organismal traits occurs across ecological (e.g. genetic, taxonomic diversity), spatial (e.g. agroforestry) and/or temporal (e.g. crop rotation) scales, and may contribute to maintaining and regenerating biotic interactions that support production and

other ecosystem functions. Diversified farming systems exist along a continuum, but often include agroecological management practices such as increased crop rotation complexity, cover cropping (i.e. the use of non-harvested crops), the use of organic nutrient sources such as legumes or manure, and biological control (Iverson *et al.*, 2014). Particular functional groups of crops, such as legume cover crops and perennials, increase functional diversity with plant traits that supply and retain nutrients and increase soil organic carbon storage (Blesh, 2017). At larger scales, diversified farming systems can also reduce agriculture's contribution to global climate change by reducing external input dependency and associated greenhouse gas emissions. Although processes of farm diversification are managed at the plot and farm (i.e. farming household) scales, the aggregate effect of a network of diversified farms at landscape levels supports resilience in the food system.

Farm diversification also contributes to delivering improved nutrition and diet outcomes at multiple scales. At the household scale, diversified farming systems can support dietary diversity among family farmers in the context of a changing global nutrition landscape (Berti and Jones, 2013). By supporting higher levels of agrobiodiversity, diversified farming systems may increase dietary quality by increasing a farm household's dietary diversity (Jones, Shrinivas and Bezner Kerr, 2014), or through income generation to purchase foods (Sibhatu, Krishna and Qaim, 2015). Dietary diversity is of central importance to food security and nutrition, and is often used as a proxy of dietary quality because more diverse diets are positively associated with the nutrient quality of diets (Jones *et al.*, 2013). Poor dietary quality is leading to the so-called "dual burden of malnutrition," a public health issue characterized by the coexistence of nutrient deficiencies along with overweight and obesity (Rivera *et al.*, 2004), particularly in middle-income countries such as Brazil. At the landscape/community scale, a higher abundance of diversified farms contributes to food system resilience through positive effects on the nutritional security of non-farming populations by increasing access to diversified foods for the local population (Remans *et al.*, 2015).

11.3 Public procurement: a mechanism to diversify farming systems?

Targeted public food procurement programmes, such as PNAE, may foster farm diversification by offering: (1) demand for *diversified food products* (e.g. vegetables, legumes, dairy products); (2) a reliable source of *income generation* by creating favourable market conditions for family farmers; (3) *price stabilization* through the establishment and negotiation of prices; and (4) *predictable and reliable demand* for agricultural products that reduces risks and uncertainties associated with commodity markets (Sumberg and Sabates-Wheeler, 2011; Nehring, Miranda and Howe, 2017). These four characteristics make it less risky and more profitable for farmers to produce a diverse range of products for local and regional markets (Sumberg and Sabates-Wheeler, 2011). Stable and predictable market access for family farmers also strengthens local and regional markets, which can benefit food security and resilience by increasing access to local foods and improving dietary quality.

A substantial body of research has focused on evaluating outcomes of public food procurement for food beneficiaries, but effects on the farms and households of participating family farmers remain understudied. Recent case studies of food procurement programmes in Brazil observed two key changes in family farming practices: an increase in agrobiodiversity and a transition towards agroecological management (Blesh and Wittman, 2015; Chappell, Moore and Heckelman, 2016; Guerra *et al.*, 2017; Valencia, Wittman and Blesh, 2019). Therefore, public procurement programmes that offer a price premium for organic practices may drive, at least partially, transitions to agroecological management.

Brazil's National School Feeding Programme (PNAE)

School feeding programmes based on targeted public food procurement aim to increase children's consumption of locally and regionally procured food. The focus on *locally* produced food reflects increasing understanding of the benefits to farmers, traders and consumers that can be derived from more localized procurement strategies (Sumberg and Sabates-Wheeler, 2011). Brazil's National School Feeding Programme (Programa Nacional de Alimentação Escolar, PNAE) is a globally lauded public procurement programme that links objectives related to food security,

education and rural development. PNAE originated in the 1950s as a school meal programme, but has been substantially redesigned since 2009. PNAE is now part of a broader food security strategy based on the creation of new markets driven by public procurement (Schneider *et al.*, 2016). The success of PNAE in reducing child malnutrition, increasing access to healthy foods, improving eating habits and reducing school absenteeism has inspired many countries in Latin America and Africa to replicate and adapt its strategies (Food and Agriculture Organization of the United Nations [FAO], 2014). Since 2009, PNAE has provided a premium for certified organic and agroecological products (a price premium of up to 30 percent) and priority in contracts for certified production. PNAE is also committed to investing at least 30 percent of its budget in purchasing from local family farmers. "Local" here refers to the municipal scale, where family farmers supply food for the schools in their own municipalities. The establishment of a budget benchmark for expenditures on family farmers, and a premium for organic products, has created a unique market for diversified food and agricultural products for family farmers. In this way, PNAE is a form of public investment in a broader suite of social-ecological services from farms (see Chapters 8, 9, 10, 12, 14, 15 and 16 for additional analysis of PNAE in Brazil).

Targeted food procurement programmes are of strategic importance to allowing smallholder farms to transition to diversified farming systems and remain economically viable while supporting their contribution to local food security and nutrition. Supporting the production of diversified crops is particularly important given the homogenization of the food supply towards a few staple crops such as corn, wheat and rice (Khoury *et al.*, 2014). As such, this form of public procurement programme responds to growing calls for mechanisms to sustain and enhance smallholders' contributions to production diversity and hence to the overall dietary diversity of the world's population (Fanzo, 2017).

Effects of PNAE on farm diversification

In a recent study in southern Brazil, land use history assessments were conducted to identify the effects of PNAE on the process of farm system diversification (Valencia, Wittman and Blesh, 2019). It was found that farmers' participation in PNAE played a direct role in farmers' decisions to shift their household's primary economic focus from low agrobiodiversity, input-intensive farming systems (e.g. corn or soy

monocultures) to more diversified, low external input systems (e.g. horticulture). Once PNAE emerged as an easily accessible and stable market for a variety of food crops, many farmers expanded the area of their horticulture plots from small home gardens for household consumption to market-oriented plots. Farmers explained that this shift was incentivized by guaranteed purchases leading to a reliable monthly income distributed over the school year, and by the stability and accessibility of the market generated by PNAE. For the farmers who were already market-oriented horticultural producers, the price premium offered by PNAE for certified agroecological products supported a transition to organic production practices. Local non-governmental organizations (NGOs) and farmers' associations were fundamental in supporting participation in PNAE and a transition to agroecological practices (Guerra *et al.*, 2017). Farmers explained that the reason for this transition was that organic horticultural production had lower production costs (e.g. lower or no costs for agrochemical inputs, lower labour requirements) and land requirements (i.e. higher profits per unit area) than did commercial gain cultivation (corn, beans, soybeans).

Among farmers participating in PNAE, the most significant change was an increase in the total land area planted with diversified food crops (i.e. horticulture plots), which among larger-sized farms also resulted in a significant increase in agrobiodiversity (Valencia, Wittman and Blesh, 2019). Moreover, higher levels of agrobiodiversity were associated with a lower use of synthetic inputs. However, this result may not necessarily be driven exclusively by PNAE since farmers who were not participating in PNAE also had a low use of synthetic inputs in their horticulture plots. Therefore, this may instead reflect the potential of managing diversified farming systems with no or low synthetic inputs by following agroecological practices. More work is needed to better understand the links between biodiversity, ecosystem functions and reduced input dependency. Presumably, greater agrobiodiversity alongside use of ecological practices supported beneficial ecological processes such as soil organic matter accumulation, trophic interactions that control pests and diseases, or nutrient supply through biological nitrogen fixation or decomposition; however, measuring changes in these processes was outside of the scope of this study. Future research should also focus on understanding other metrics of diversity, such as plant functional traits, and their relationship to ecosystem functions. Elucidating mechanistic relationships between farm-scale functional diversity and ecosystem services remains a critical

research need (Wood *et al.*, 2015), which could inform improvements to farm management and to agro-environmental policy schemes.

Building food system resilience

Diversified farming systems face significant challenges in terms of policy support, market access and research and development. Public support to generate greater social-ecological services from farms is needed for food systems that expand the distribution of nutritious foods to a wider population. In particular, targeted public food procurement is an undervalued policy instrument capable of addressing some of the complex problems related to food system resilience and food insecurity. In this form of market, the state mediates relationships between supply (family farms) and demand (food security and public nutrition programmes) (Wittman and Blesh, 2017). The PNAE programme in Brazil exemplifies how the strategic use of public procurement may align efforts across multiple sectors (agriculture, public health and nutrition, and education) to respond to the need for policies that build resilience in both rural economies and food systems in the context of global environmental change (see also Chapter 8).

Public support through PNAE may increase the diversity of farms, but the effects of PNAE on diversification outcomes may be moderated by farm size (Valencia, Wittman and Blesh, 2019). PNAE may be more appealing to the relatively smaller farms where horticulture is preferable in terms of returns per unit area and labour requirements. For small farms, the main contribution of PNAE was enabling farmers to transition a greater area of their cultivated land to diversified horticulture for regional markets. Larger-scale family farmers who focused on the production of commodity crops such as soybean did not generally seek integration into the mediated market for local foods created by PNAE, even if they also maintained small, low-input horticultural plots for household consumption. However, among the larger family farms that did participate, PNAE had the important effect of increasing overall agrobiodiversity as well as the proportion of land area in horticultural production for regional markets; the programme also increased household consumption of vegetables produced on the farm, and reduced the use of external inputs. This is consistent with other research showing that farm size affects production patterns and decision-making, because smaller- and larger-scale farms have differential capacities to capture economies of scale and invest in equipment and other resources. For example, as farms grow in size, crops that are more suitably grown

on small plots (e.g. vegetables) are reduced as a percentage of total farm area, whereas field crops that can be cultivated with mechanized techniques (e.g. cereal crops) are maintained or increased (Herrero *et al.*, 2017).

Increases in the production of socio-economic (e.g. improving farmers' livelihoods) and nutritional (e.g. increasing the production of diversified foods) services are currently the most important effects of PNAE. As a programme that primarily targets the procurement of vegetable and fruit crops, PNAE may actually have limited off-farm environmental impacts. That is, PNAE does not necessarily provide a sufficient incentive to transform management practices for the entire farm or for all cropping system types. In spite of the increase in diversified production on PNAE farms, the absolute area of diversified cropping systems is still relatively small compared to total farm size, and management practices in the other cropping systems that occupy more land – usually monocrops managed with agrochemical inputs – in many cases remained unaffected by PNAE (Valencia, Wittman and Blesh, 2019). For example, both agroecological and input-intensive systems often continue to coexist within farms (e.g. a conventionally managed corn plot alongside an ecologically managed horticultural plot).

Plot level differences in management practices across different cropping systems also speak to a more nuanced effect of PNAE (Guerra *et al.*, 2017). For example, the use of synthetic inputs for horticultural plots was not different between PNAE and non-PNAE farmers, regardless of farm scale. This means that many farmers were already managing their vegetable plots in low-input, high agrobiodiversity systems. On the other hand, external input use intensity for corn and beans was lower for PNAE farmers than for non-PNAE farmers. These differences are likely not the direct result of PNAE, but rather a secondary effect. Farmers in PNAE are often also involved in workshops organized by local NGOs and are in contact with extension agents who promote agroecological practices; in contrast, soybean and garlic farmers regularly receive technical assistance associated with the sale of agrochemical inputs and seeds. It is through this channel that PNAE's impacts on management may eventually extend to the whole farm and help realize broader environmental sustainability goals.

The use of public procurement as a policy instrument to drive food system sustainability should consider access to infrastructure and resources as potential mediating factors in the success of this type of public policy. Many of the positive

examples of targeted public food procurement come from the south of Brazil (e.g. Valencia, Wittman and Blesh, 2019; FAO, 2014; Chapter 8 and Chapter 16 of this book). Southern Brazil is characterized by higher infrastructure development, access to credit and resources, and economic development relative to other regions in Brazil (Medina *et al.*, 2015). This means that it cannot be assumed that the success of PNAE in the south of the country may be equally replicated in other regions (see Chapter 25 for an overview of PNAE's regional differences). Moreover, in the south of Brazil, growing diversified food products for household consumption – along with its management knowledge – existed before the onset of PNAE. In regions where home gardens are not part of local traditions (and hence local knowledge on growing diversified foods may be absent) farmers may face additional limitations in responding to targeted procurement programmes such as PNAE.

Finally, one may argue that farmers involved in PNAE have displaced their dependency from the commodity market to an institutional market, which has in recent decades been less volatile and risky than commodity markets. This creates a different type of vulnerability for participating farmers because they now depend on this commercialization channel. If PNAE were to be terminated or modified to its operational model before its redesign in 2009, the continuity of diversified farming systems may be jeopardized. This highlights the need for coordinated efforts, as well as public pressure, to sustain policies such as PNAE.

11.4 Conclusion

Diversified farming systems have the potential to contribute to environmentally sustainable and socially equitable systems that may buffer against global climatic and environmental change (Kremen, Iles and Bacon, 2012; Schipanski *et al.*, 2016). However, mainstream markets and dominant agricultural policies make it difficult for diversified and small-scale farmers to thrive. Public policies that create new markets for diversified farming systems contribute to food system resilience by supporting diversified farming systems. However, this market support may have a limited impact on environmental sustainability, given that only a limited number of family farmers participate and the sustainability changes that PNAE brings are focused on vegetable cropping systems that take up a small amount of total farm area. Broader impacts for

environmental outcomes could depend on whether low input, diversified production for PNAE ends up motivating changes to management on farmers' other cropped fields.

Public procurement may contribute to food system resilience through four key strategies. First, targeted public food procurement supports diversified farming systems by increasing the demand for agrobiodiversity and including incentives for agroecological practices. Second, targeted public food procurement creates an economically viable and stable market for diversified agricultural products that is an alternative to volatile, unpredictable commodity markets. Third, public food procurement programmes link local producers (family farmers) with local consumers (e.g. procurement beneficiaries) in a process of economic localization. Food system localization as an economic development strategy is emerging as a key response to the negative effects of globalization and trade liberalization. Lastly, public procurement increases local and regional access to nutritious food by generating a spillover effect in which excess horticultural production is channeled through local markets. By linking production and consumption at the municipal level, targeted public food procurement may strengthen local and regional food systems and increase the availability of diversified, nutritious foods. As such, targeted public food procurement is a promising strategy to foster food system resilience by simultaneously supporting rural development and food security and nutrition.

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12 BIODIVERSITY FOR FOOD AND NUTRITION: PROMOTING FOOD SECURITY AND NUTRITION THROUGH INSTITUTIONAL MARKETS IN BRAZIL

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ABSTRACT

A well-established political and regulatory framework exists in Brazil to promote food security and nutrition. Among its key elements are the Food Purchase Programme (PAA) and the National School Feeding Programme (PNAE), two institutional food procurement programmes that provide equitable support to family farmers by acquiring their products at a fair price and directing them to public schools, public programmes and social organizations. Both PNAE and PAA were identified by the Biodiversity for Food and Nutrition Project (BFN) (which is funded by the Global Environment Facility) as potential entry points to improve nutrition and livelihoods by linking them to native biodiversity and its conservation. BFN increased awareness on the importance and nutritional value of food species from Brazilian biodiversity through advocacy and capacity building workshops and by engaging in strategic alliances and partnerships with key actors involved in PNAE, PAA and related policies.

12.1 Introduction

Occupying roughly half of South America with a surface area of 8 515 759 km^2, Brazil is the fifth largest nation in the world and one of the world's 17 top biodiversity-rich ("megadiverse") countries. The country harbours approximately 20 percent of the world's plant biodiversity, with 49 416 recognized plant species, as well as an estimated 9 000 vertebrates and 130 000 invertebrates. Many of these are endemic and live in the heterogeneous habitats that characterize the country's six different biomes: the Amazone, Cerrado, Caatinga, Atlantic Forest, Pampa and Pantanal (Brazil, REFLORA Programme, 2020; Joly *et al*., 2019). Brazil's richness in biological diversity is matched by its cultural diversity: 900 000 indigenous people live in the country, belonging to 305 ethnic groups and speaking 274 languages. In addition, five million traditional communities such as the *caiçaras*,[1] *quilombolas*,[2] rubber tappers, riverine populations, babassu nut breakers and *pantaneiros*,[3] among others, inhabit one fourth of the country's territory (Brazil, Brazilian Institute of Geography and Statistics [IBGE], 2017). Many of these indigenous and traditional communities are custodians of knowledge and practices that help maintain Brazil's rich natural diversity and keep cultural and spiritual practices alive. For example, at least 469 plant species from 84 families are managed in agroforestry systems (Joly *et al*., 2019). The term "socio-biodiversity products" has been coined to indicate the final products, raw material or benefits deriving from biodiversity; these are sustainably used and maintained by traditional communities and family farmers while protecting the environment.

Over the past two decades, Brazil has suffered unprecedented biodiversity loss and environmental degradation due to land use changes, such as the conversion of untouched land into agricultural land and urbanization. Currently, 1 173 animal species and 2 118 plant species are listed as endangered; climate change, pollution and the spread of invasive alien species are exacerbating this problem (Joly *et al*., 2019). Exotic or introduced species (such as sugar cane, soy, orange trees, rice, coffee or maize)

[1] *Caiçaras* are inhabitants of the coastal regions of southeastern and southern Brazil who descend from native indigenous peoples and the Portuguese.

[2] *Quilombola*s are inhabitants of the remnants of quilombos – communities formed between the sixteenth and nineteenth century by runaway African slaves.

[3] *Pantaneiros* are inhabitants of the Pantanal, a tropical wetland area located largely within the Brazilian State of Mato Grosso do Sul but extending into Mato Grosso and portions of Bolivia and Paraguay. The majority of *pantaneiros* are cattle ranchers, but there are also fishermen.

dominate large-scale agricultural production (Brazil, Ministry of Agriculture, Livestock and Supply and Ministry of the Environment, Chico Mendes Institute for Biodiversity Conservation, 2019). Diets are shifting towards more simplified, obesogenic diets, with a consequent rise in obesity levels from 11.8 percent in 2006 to 19.8 percent in 2018, particularly among women (Brazil, Ministry of Health, Department of Surveillance of Noncommunicable Diseases and Health Promotion, 2019).

The Household Budget Survey (Brazil, IBGE, 2011) highlighted that 75 percent of Brazilians consume high amounts of ultra-processed foods and insufficient amounts of fruits or vegetables – well below the daily intake of 400 g recommended by the World Health Organization (WHO). In addition, the fruits consumed are predominantly exotic to the country (e.g. oranges, bananas, apples, papayas, mangoes, watermelons, tangerines and grapes), except for pineapples and açai. Although the share of the population that consumes the recommended amounts of fruits and vegetables has risen in recent years (from 20 percent in 2008 to 23 percent in 2018) (Brazil, Ministry of Health, Department of Surveillance of Noncommunicable Diseases and Health Promotion, 2019), consumption of native species remains low, mostly because of a lack knowledge about their use and of information about their nutritional value.

Native food species are undervalued, despite their nutritional advantage over exotic species (Hunter *et al.*, 2019). Significant market and non-market barriers exist in Brazil, as elsewhere, that hinder a better uptake of neglected and underutilized species to enhance food and nutrition security. Using the multisectoral institutional framework established in Brazil under the Zero Hunger Strategy, the multi-country Biodiversity for Food and Nutrition (BFN) project (2012–2019) aimed to address some of these constraints by strategically targeting institutional markets to create a structured demand for these foods.

The Food Purchase Program (PAA) and the National School Feeding Programme (PNAE) were targeted as the two key federal government programmes with the greatest potential for diversifying institutional food procurement and improving diets while supporting family farming and promoting the conservation and sustainable use of neglected and underutilized species (Beltrame *et al.* 2016; United Nations System Standing Committee on Nutrition [UNSCN], 2017; Hunter *et al.*, 2015, 2016, 2019). In 2018, a list of 101 species of current or potential nutritional value was formalized by

Portaria Interministerial MMA e MDS N° 284 (Interministerial Ordinance MMA and MDS No. 284). This legal instrument recognizes the nutritional value of native food species and guides the management of institutional markets (e.g. through public procurement policies).

This paper discusses how policy and communication efforts can play a major role in the creation of an enabling environment for healthier food choices, and how they can promote the procurement of biodiversity products and encourage family farmers to sell their products to institutional food buyers such as school feeding programmes (see Chapters 2, 8, 9, 10, 11, 14, 15 and 16 for additional analysis of the Brazilian experience).

12.2 The Biodiversity for Food and Nutrition project in Brazil

The BFN approach

BFN aims to mainstream the conservation and sustainable management of native biodiversity into national and global nutrition, food security and livelihood strategies and programmes.[4] Far from being prescriptive, BFN used a three-pronged approach that can be adapted to a variety of geographical and political contexts, and is applicable to the entire food value chain, from production to consumption. BFN aimed to improve knowledge on undervalued food biodiversity (component 1), strengthen policies and regulatory frameworks that regulate this diversity (component 2), boost the capacity of producers to use and benefit from this diversity, and stimulate demand for socio-biodiversity foods by developing value chains for these products while raising awareness of their value (component 3).

BFN was implemented in four countries – Brazil, Kenya, Turkey and Sri Lanka. To implement the project, Brazil decided to build on ongoing efforts under its Zero Hunger strategy (Fome Zero), a multisectoral framework established at the federal

[4] The project Mainstreaming Biodiversity for Conservation and Sustainable Use for Improved Human Nutrition and Wellbeing (BFN) was a project of the Global Environment Facility (GEF); it was coordinated by Bioversity International, and its implementation was supported by the United Nations Environment Programme (UNEP) and the Food and Agriculture Organization of the United Nations (FAO). Additional support for the project was provided by the CGIAR Research Program on Agriculture for Nutrition and Health. The project contributes to the Convention on Biological Diversity's Cross-cutting Initiative on Biodiversity for Food and Nutrition.

level to solve the country's food security and nutrition issues (Beltrame *et al.*, 2016). The following actors were involved in the implementation of BFN: the Ministries of the Environment, of Agriculture, Livestock and Supply, of Social and Agrarian Development, of Education, of Science, Technology, Innovation and Communication, and of Health, as well as the National Supply Company (Conab), the Brazilian Agricultural Research Corporation (Embrapa) and the Food and Nutrition Security National Council (Consea). A project governance mechanism, the national steering committee, was established to coordinate and manage the activities of the partners in a transparent manner.

Of relevance to this chapter is BFN's engagement with Brazil's largest public procurement programmes, PAA and PNAE. These programmes have the greatest potential to create a large, reliable and stable market for socio-biodiversity products. In 2013, the institutional demand for food from family farmers from these two programmes was worth over USD 1 billion (International Policy Centre for Inclusive Growth, 2013). Since its launch in 2003, PAA has benefitted almost 200 000 families; more than three million tonnes of food were purchased under the programme between 2003 and 2012 (Swensson, 2015; World Food Programme [WFP], 2015).

The two programmes are central to Brazil's food security and nutrition strategy; they also contribute towards education and health outcomes and help achieve the broader objectives of social development and poverty reduction by providing incentives for family farmers to engage in sustainable agriculture and manage Brazil's food diversity. PNAE is legally bound to purchase a proportion of its food from family farmers; PAA focuses exclusively on them. Both programmes pay a 30 percent premium for organic or agroecological products and give preference to suppliers from indigenous and traditional communities. Additionally, PAA supports activities for the conservation, production, storage and distribution of local or traditional seed varieties by purchasing seeds produced by family farmers experiencing food insecurity (Brazil, Ministry of the Environment, 2006).

In 2012, when the BFN project started, the two programmes were buying only limited quantities of foods from native biodiversity (Beltrame *et al.*, 2016). Furthermore, despite the large number of native food species available, only 11 were included in the official inventory of local production systems of a government programme guaranteeing minimum prices for socio-biodiversity products (PGPM-Bio). Under this

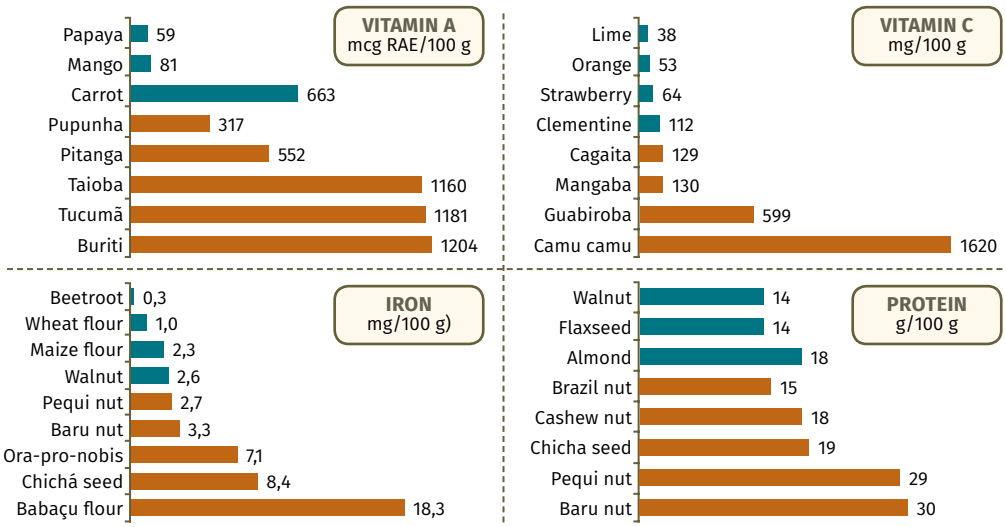
programme, the federal government sets a fixed market price for selected socio-biodiversity products; it intervenes to compensate producers or collectors who are unable to sell their products at this minimum market value. Against this background, the BFN project in Brazil identified PAA and PNAE as ways to boost the demand for sustainably produced socio-biodiversity products, while improving the quality and diversity of the diets of beneficiaries and improving the livelihoods of family farmers.

Highlighting the nutritional value of biodiversity foods

The lack of appreciation of the value of biodiversity for food and nutrition was identified early on in the BFN project as one of the main causes of biodiversity loss in Brazil; it was also found likely to restrict the market demand for these foods. While some information on the nutritional quality and traditional use of biodiversity for nutrition existed at the start of the project, data were scattered and obsolete or unreliable, and there was no single data repository. In addition, very little information was available on the role played by these foods in Brazilian diets.

The point of departure for building a new database on Brazilian biodiversity for food and nutrition was the Plants for the Future initiative, coordinated by the Ministry of the Environment. The Ministry had carried out research to identify and prioritize species of Brazilian flora of current or potential economic value for different types of use such as food, aromatic, ornamental, medicinal, fibrous and forage. Seventy-eight edible species (mostly fruits and nuts) became the focus of the BFN project. A first step was to determine the nutritional content of the species, to build a knowledge base and attract the interest of the two public procurement programmes. This was done in partnership with public universities and research institutes across the country, using methodologies developed by the Food and Agriculture Organization of the United Nations (FAO) and the International Network for Food Data Systems (INFOODS). Food composition data were taken from secondary sources (e.g. scientific documents and reports from national universities and research institutes) or generated through laboratory analysis; they revealed that many of the prioritized native species are richer in nutrients compared to more commonly consumed exotic foods, as shown in Figure 1. Figure 2 presents a number of Brazilian socio-biodiversity food species.

Figure 1 **Nutrient content of Brazilian socio-biodiversity food species (orange) and other commonly consumed foods (blue)**



Note: values are expressed per 100 g of edible portion in fresh weight basis.

Sources: Brazil, Center for Studies and Research in Food (NEPA) and University of Campinas (Unicamp), 2011; Brazil, Brazilian Biodiversity Information System (SiBBr), 2018.

Figure 2 **Examples of Brazilian socio-biodiversity food species**

1. Babaçu; **2.** Baru; **3.** Buriti; **4.** Cagaita; **5.** Camu camu; **6.** Chicha; **7.** Guabiroba; **8.** Pitanga; **9.** Ora pro nóbis; **10.** Tucumã; **11.** Taioba; **12.** Pupunha; **13.** Mangaba; **14.** Pequi; **15.** Castanha do pará.

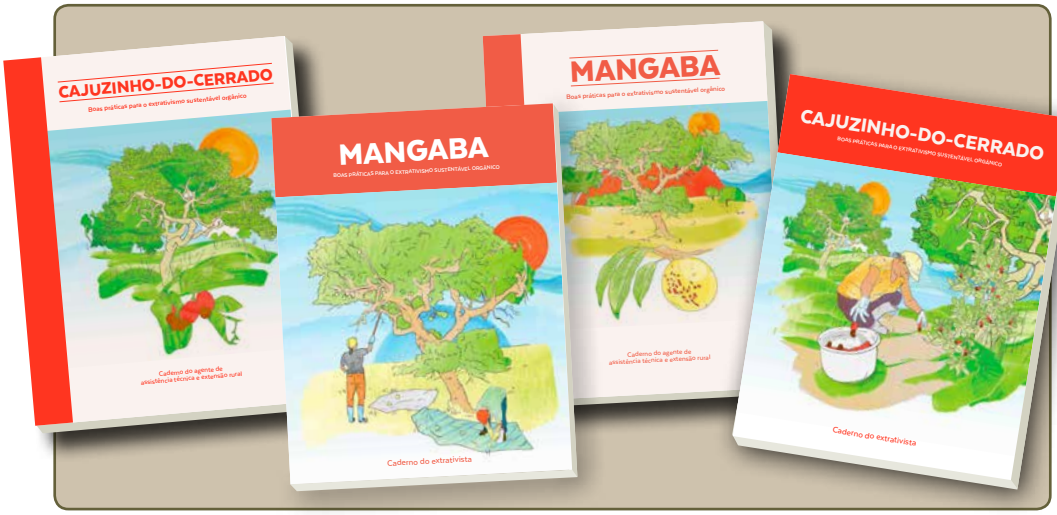
The information was generated in partnership with the Brazilian Biodiversity Information System (SiBBr) at the Ministry of Science, Technology, Innovation and Communication. It became the basis to solicit demand for biodiversity products from PAA and PNAE. The information has now been made available online via the Biodiversity and Nutrition Food Composition Database (Brazil, SiBBr, 2018).[5]

A critical entry point for the mainstreaming of biodiversity was the involvement in the collection of food composition and consumption data of the Collaboration Centers on School Food and Nutrition (CECANEs) of the National Fund for Educational Development (FNDE). CECANEs are firmly present within federal universities across Brazil. They are funded by PNAE and provide the programme with research and technical backstopping, in addition to providing training to local communities, municipal and school managers, nutritionists and cooks as part of the implementation of PNAE across Brazil. With help from the CECANEs, regional centres for food composition data were set up to provide regional support for school feeding programmes.

To meet the potential rise in demand for native biodiversity and address barriers to the improvement of food biodiversity in Brazil (such as the lack of skills and institutional capacities, and the poorly developed markets for native species), efforts targeting the producers and collectors of this diversity were undertaken. Far from being mainstream crops, socio-biodiversity species fall outside the scope of agricultural domestication programmes. Many are collected from the wild, are highly perishable and require unique methods of production, handling, processing, transportation and storage in order to meet the stringent quality standards set by institutional procurement programmes (Beltrame *et al.*, 2016). To improve the supply chain of native biodiversity and add more value to these products, guidelines for the sustainable collection of 21 socio-biodiversity species targeting producers and extension workers were jointly developed by the Ministry of the Environment and the Ministry of Agriculture, Livestock and Supply (Brazil, Ministry of the Environment, 2018; Brazil, Ministry of Agriculture, Livestock and Supply, 2014) (see Figure 3).

[5] See **https://ferramentas.sibbr.gov.br/ficha/bin/view/FN**

Figure 3 **Examples of guidelines for the sustainable collection of wild edibles published by the Brazilian Ministries of the Environment and of Agriculture, Livestock and Supply**



Source: Brazil, Ministry of the Environment, 2018; Brazil, Ministry of Agriculture, Livestock and Supply, 2014.

Creating an institutional demand for biodiversity foods and boosting production

The next challenge was to ensure that the data were made available to those responsible for the implementation of PNAE and PAA, who were struggling to increase the use of native neglected and underutilized species in their programmes and in their school menus to support family farmers.

Along with actions to improve the capacities of PNAE staff to integrate more socio-biodiversity into institutional procurement, a momentous boost in the commercialization of native food species was provided by the publication of the official list of native Brazilian socio-biodiversity species of nutritional value. The list was laid down in *Portaria Interministerial N° 163 de 11 de maio de 2016* (Interministerial Ordinance No. 163 of 11 May 2016), which was superseded by *Portaria Interministerial MMA e MDS N° 284* (Interministerial Ordinance MMA and MDS No. 284) in 2018. It officially defines and recognizes over 100 native species of nutritional importance, which were originally identified by the Plants for the Future initiative

of the Ministry of the Environment. The inclusion of these species in the ordinance, together with the publication of the nutritional information in the SiBBr database, has greatly increased the marketing potential of native species. Indeed, ministries now refer to the ordinance's list to buy, organize and monitor purchases of socio-biodiversity products through their food procurement programmes. The list has also helped clarify the definition of "biodiversity for food and nutrition"; differences in the definition of the concept had hitherto hindered efforts to monitor and track public procurement of Brazilian biodiversity (Beltrame *et al.,* 2016).

The monitoring and promotion of the use of native biodiversity in school procurement also benefited from the creation of a food and nutrition security quality index (IQ COSAN) (Brazil, FNDE, 2018). Developed to help nutritionists and those implementing school feeding programmes plan healthy and balanced school meals, the tool allocates point-based ratings to school meals depending on their levels of dietary diversity and the absence of unhealthy foods such as sugars, sweets and processed and fried foods. Additional points are allocated if meals include any number of the neglected and underutilized species listed in the official list of native Brazilian socio-biodiversity species of nutritional value of Interministerial Ordinance MMA and MDS No. 284. The IQ COSAN manual helps schools monitor the nutritional adequacy of school meals and align menus with official dietary guidelines. It also encourages school nutritionists and managers to incorporate underutilized native species into school meals to increase their ratings (Brazil, FNDE, 2018a).

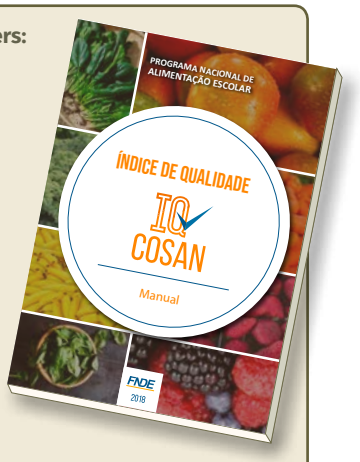
Not only technical staff responsible for PAA and PNAE at the federal level were involved in the implementation of the BFN project; efforts were also made to integrate biodiversity in other public policies and platforms related to food security and nutrition and food procurement, for example Consea, the National Plan for Food and Nutritional Security (Plansan 2016–2019), the National Pact for Healthy Eating, and the National Plan on Agroecology and Organic Production (Planapo). Procurement programmes are also closely aligned to the National Food and Nutrition Policy (PNAN), coordinated by the Ministry of Health. Therefore, training materials targeting teachers and health care professionals were developed in collaboration with PNAN, as part of the School Health Programme (PSE). These materials are aligned with national dietary guidelines, and highlight the role of native socio-biodiversity and regional foods in diversifying diets and reviving traditional culture.

Figure 4 **IQ COSAN manual: parameters for rating**

IQ COSAN assess the quality of school meals based on four parameters:

1. Presence of the following food groups:
   a) cereals, and roots and tubers
   b) pulses
   c) vegetables
   d) fresh fruits
   e) milk and dairy products
   f) meat and eggs
2. Presence of regional foods or socio-biodiversity products.
3. Dietary diversity (on a weekly basis).
4. Absence of restricted or banned foods such as sugars, sweets and processed and fried foods.

Point-based ratings are assigned to each parameter. The sum of the ratings determines whether school meals are ranked as inadequate, in need of improvement or adequate.



Source: Brazil, FNDE, 2018a.

Interministerial Ordinance No. 163 of 11 May 2016 created a reliable market for the products of 25 million foragers and family farmers who manage and grow native biodiversity species (Ministry of the Environment, Chico Mendes Institute for Biodiversity Conservation, 2019). A second ordinance (*Porteria N° 654/2018* [Ordinance No. 654/2018]), issued the same year by the Special Secretariat for Family Farming and Agrarian Development, created additional market incentives by establishing a socio-biodiversity label for all products listed in Interministerial Ordinance MMA and MDS No. 284 (see Figure 5). The label has a validity of two years (renewable) and can be requested by family farmers, cooperatives and small and medium enterprises with a strong link to family farming registered with the National Programme for Strengthening Family Agriculture (Pronaf). Registration with Pronaf and the use of the socio-biodiversity seal open up institutional market opportunities for family farmers and foragers.

Figure 5 **Official Brazilian label for socio-biodiversity products**

Source: Portaria N° 654, de 9 de novembro de 2018 (Ordinance No. 654 of 9 November 2018).

Communicating and educating to embrace socio-biodiversity

Considerable efforts were undertaken to raise awareness as to the use of socio-biodiversity to diversify diets. These efforts promoted the recognition of the value of socio-biodiversity products for public food procurement and boosted institutional demand for them. The dietary guidelines for the Brazilian population of the Ministry of Health promote healthy diets with foods derived from socially and environmentally sustainable food systems and highlight the importance of biodiversity. Meanwhile, the publication *Brazilian Regional Foods* provides recipes to help school nutritionists and school cooks develop school meals (Brazil, Ministry of Health, 2014, 2015).

The limited familiarity with socio-biodiversity foods, i.e. the lack of knowledge about how to use and prepare these forgotten foods, constitutes an important barrier to their greater consumption. A survey into the use of socio-biodiversity in school procurement and school meals carried out in 2015 across 21 municipalities in the South Region of Brazil revealed that out of 35 species listed, only three were present in school purchases or school meals (Girardi *et al.*, 2018). While it is important to persuade school managers and employees of the nutritional value of these foods, attention should also be given to the final consumers: the children. Prior to introducing socio-biodiversity foods into school meals, nutritionists and cooks should

be aware that children may be unaccustomed to the new tastes and textures (see, for example, the study carried out by Quinalha (2019) into the acceptability of school meals containing red pineapple (*Ananas bracteatus*) in two schools in Rio Grande do Sul). Promoting these foods in nutrition education activities, for example by using school gardens, has proved a successful way of engaging students and bringing about positive behavioural changes for healthy eating (Hunter *et al.*, 2020).

The BFN project collaborated with the Educating with School Gardens and Gastronomy initiative (PEHEG), carried out by the Centre for Excellence in Tourism of the University of Brasilia and funded by FNDE (see Figure 6). The collaboration has helped mainstream socio-biodiversity into PEHEG's activities through the inclusion of information on socio-biodiversity and awareness-raising on its nutritional value to improve eating habits and diversify diets. PEHEG staff have a strong presence in municipalities and provide direct technical assistance to schools, thus acting as important messengers for socio-biodiversity. By the time PEHEG ended in 2016, school gardens had been established in 541 municipalities across Brazil (Beltrame *et al.*, 2016; Domingues dos Santos *et al.*, 2020).

Figure 6 **School garden set up under the PEHEG initiative at a municipal school in Padre Bernardo (Goiás)**

Biodiversity for Food and Nutrition Project

To assist those responsible for the planning and preparation of school meals, the BFN project published, in collaboration with partner universities, nutritionists and the gastronomy sector, a book with 335 recipes using 64 native underutilized species entitled Brazilian Biodiversity: tastes and flavours (Santiago and Coradin, 2018).[6] Socio-biodiversity was also the main theme of the second edition of the Best School Feeding Recipes competition launched by FNDE and sponsored by WFP's Centre of Excellence for the Fight Against Hunger and FAO (see Figure 7). The competition brings together school cooks from all over Brazil to prepare the healthiest and most nutritious school meals that are also appealing to students. In 2018, 2 252 school cooks from Brazil's five regions took part in the competition. Three of the 15 finalists used socio-biodiversity ingredients for the preparation of the following dishes:

- savoury rolls with baru nuts (*Dipteryx alata*);
- grilled fish with pupunha fruits (*Bactris gasipaes*) and tucupi (fermented cassava broth);
- pasta with tucupi, jambu leaves (*Acmella oleracea*) and powder of urucum seeds (*Bixa orellana*).

Figure 7 **Recipe book of the second edition of the Best School Feeding Recipes competition**

Source: Brazil, FNDE, 2018b.

[6] See www.mma.gov.br/publicacoes/biodiversidade/category/54-agrobiodiversidade.html

The recipes of the 15 finalists of the second edition of Best School Feeding Recipes competition were collected in a recipe book, with a special chapter devoted to the importance of socio-biodiversity. The recipe book is distributed to schools and available online (Brazil, FNDE, 2018b).[7]

Outcomes and future actions

The partnership between the BFN project and Brazil's food procurement programmes is promising. Changes in behaviours and attitudes are evident within partner ministries and federal institutions, and a number of guidelines for the implementation and monitoring of food procurement purchases and preparation of school meals now include socio-biodiversity species. Significant results were also achieved with regard to the promotion of biodiversity species in diets, as highlighted in Brazil's sixth national report to the Convention on Biological Diversity (Brazil, Ministry of the Environment, 2019). The report used data generated by the BFN project and data from Embrapa to demonstrate that the country is on track to achieve the national biodiversity target 13:

> *By 2020, the genetic diversity of microorganisms, cultivated plants, farmed and domesticated animals and of wild relatives, including socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing the loss of genetic diversity (Brazil, Ministry of the Environment, 2019, p. 14).*

Although the sums spent to purchase neglected and underutilized species remain low compared to those spent on overall food purchases, there has been an increase in the uptake of socio-biodiversity in public procurement programmes, as well as an increase in total expenditures under some of these programmes. Despite the economic crisis that hit Brazil in 2014, and following a long period during which funding was not augmented, in 2017 the federal government increased the funds allocated to states and municipalities for PNAE purchases by 15 percent. As a result, an extra BRL 542 million (approximately USD 101 million)[8] was available yearly on average in 2017, 2018 and 2019 for school meal programmes in public schools, benefitting

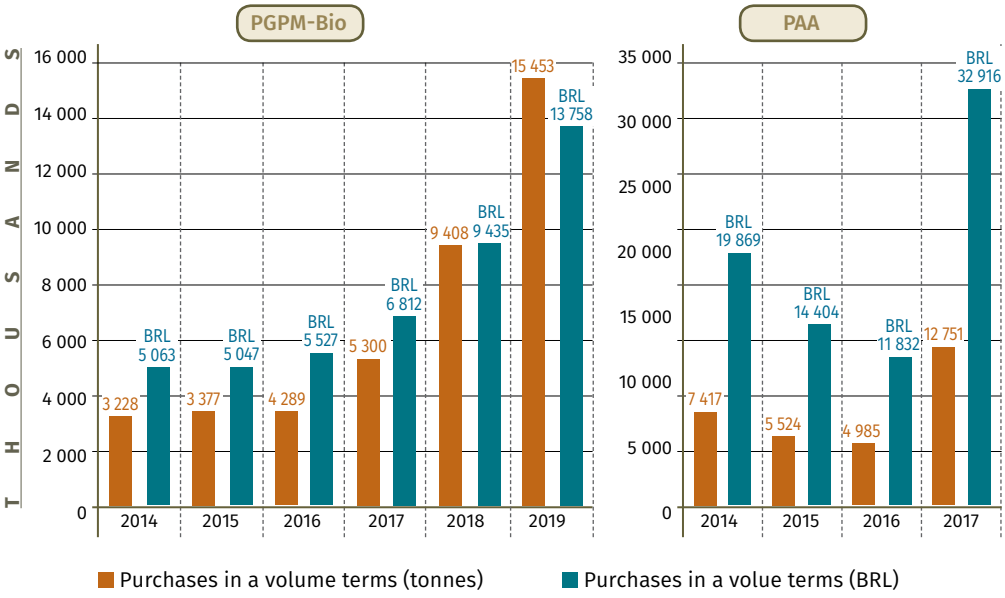
[7] See **https://centrodeexcelencia.org.br/wp-content/uploads/2018/12/Melhores-receitas-2018-WEB.pdf**

[8] USD 1 = BRL 5.33 in May 2020.

41 million pupils in primary and secondary education (Brazil, FNDE, 2020). Payments for socio-biodiversity products under PGPM-Bio grew steadily from 2014 onwards, to reach more than BRL 13 million (for 15 000 tonnes of products purchased) in 2019 (Brazil, Conab, 2020) (see Figure 8).

Despite a 20 percent cut in PAA's overall annual budget in 2017 (from BRL 430 million in 2016 to approximately BRL 360 million in 2017), the share in total funds spent under PAA on socio-biodiversity products (as listed in Interministerial Ordinance MMA and MDS No. 284) increased from 2.75 percent in 2016 to 5.02 percent in 2017, to reach a total of almost BRL 33 million in 2017 (see Figure 8) (Oliveira *et al.*, 2018; Brazil, Ministry of the Environment, Chico Mendes Institute for Biodiversity Conservation, 2019). In sum, native biodiversity was incorporated in both PNAE and PAA, which thus became strategic tools to promote the conservation and sustainable use of neglected and underutilized species. The PGPM-Bio, PNAE and PAA experiences offer an indication of the market potential of neglected and underutilized species in other institutional markets.

Figure 8 **Purchases of socio-biodiversity products under PGPM-Bio (2014–2019) and PAA (2014–2017)**



Sources: Brazil, Conab, 2020; Brazil, Ministry of the Environment, Chico Mendes Institute for Biodiversity Conservation, 2019.

Building on the experience of the BFN project, other recently launched initiatives are helping to boost the markets for socio-biodiversity and agroecology products and link producers to consumers. One example is the Green Markets and Sustainable Consumption Project (2016–2020),[9] which supports socio-biodiversity suppliers in four Amazonian states (Acre, Amapá, Amazonas and Pará) by strengthening their capacities to manage their businesses; the project also aims to boost sustainable consumption and contribute to the development of sustainable value chains (Deutsche Gesellschaft für Internationale Zusammenarbeit Gmbh, 2016).

At the national level, the recently launched National Economic and Social Development Strategy (Endes) aims to promote the sustainable use of biodiversity and the inclusion of local communities in the country's socio-economic development. Firmly based on the 2030 Agenda for Sustainable Development (United Nations, 2013), the twelve-year strategy (2020–2031) identifies five sectoral axes that will allow Brazil to position itself economically in the current global scenario (Brazil, Ministry of the Economy, 2019). Within the environmental axis, the strategy supports actions to broaden the knowledge base and sustainable use of native biodiversity. Programmes are being launched that could potentially support the production of socio-biodiversity products, such as the programme on bio-economy and socio-biodiversity (Programa Bioeconomia Brasil-Sociobiodiversidade) of the Ministry of Agriculture, Livestock and Supply. This programme aims to improve value chains based on the sustainable use of socio-biodiversity and generate income for family farmers, small and medium-sized enterprises and traditional communities.

Meanwhile, the Ministry of the Environment continues to build on the legacy of the BFN project to encourage the greater use of native biodiversity foods. In collaboration with the Ministry of Agriculture, Livestock and Supply, the Ministry is developing plans to revise the official list of native Brazilian socio-biodiversity species of nutritional value to include an additional 20 native species. A new ordinance is expected to be published in 2020, and the new list will be used by institutional procurement programmes.

[9] See **www.giz.de/en/worldwide/70390.html**

12.3 Conclusions and recommendations: lessons learned, constraints and key factors for success

In conclusion, the BFN project and the use of institutional markets to promote the conservation and sustainable use of native biodiversity foods in Brazil generated several positive outcomes. This section outlines some important lessons learned; they may serve as a source of inspiration for other countries.

Geographical coverage

Countries with a large geographical coverage and a centralized government structure, such as Brazil, may consider developing multisectoral programmes for nutrition and food security at the national level. In the case of Brazil, the decision to work at the national level was key to the effective mainstreaming of biodiversity for food and nutrition into existing food security and nutrition frameworks. Indeed, the project collaborated directly with the federal ministries responsible for the development and implementation of these policies. The nationwide focus also promoted the partnering with several federal initiatives (e.g. food procurement programmes and other public initiatives related to food security, rural development and health) of different ministries, as well as the creation of links with civil society through federal and state universities and research institutions.

In countries with a decentralized government structure, working at the local level might be more appropriate. Whatever the territorial focus, countries without an existing multi-stakeholder policy platform should dedicate financial and time resources to a stakeholder mapping exercise early on in their project; they should focus on the policies and sectors with the greatest bearing on the conservation and sustainable use of food biodiversity. Stakeholder mapping is often a lengthy and costly process.

Identifying and involving existing institutional capacities and initiatives

In the case of Brazil, the existence of excellent technical research capacities within the country, in universities and research institutions, greatly facilitated the achievement of results; it also allowed for an optimal use of time and resources. The national approach, focusing on regional traditions and capacities, favoured the decentralization of research activities, the exchange of best practices and the building of capacities; it ensured the long-term sustainability of impact of the project beyond its closure. To build the network of universities and research institutions, researchers from different regions of the country were identified and involved in the project at an early stage; the plans and goals of the project were explained to them, and they were invited to participate in those activities that corresponded most with their own research interests and technical and institutional capacities. Most of the researchers identified were already involved in the study of native species, local communities, food composition or gastronomy, which made it easier to involve them in the project. One notable example was the decision to build on prior work by the Plants for the Future initiative, which had already prioritized native species across five Brazilian regions and identified and engaged with regional and local research initiatives. In sum, it is recommendable to identify potential research partners that have worked, or are working on, similar issues during the planning phase.

The importance of an appealing theme

The central theme of the BFN project – biodiversity for food and nutrition – and its goal of improving people's diets and livelihoods were fundamental in creating a positive work environment and attracting competent and passionate professionals and students to the project. The various collaborating institutions worked on species native to their own region, and researchers and students often had personal (mostly distant) memories of them, such as eating them as children while playing with friends in gardens or special recipes prepared by their mothers and grandmothers. This personal involvement greatly contributed to their commitment to the project. With food as its central theme, the project could develop awareness raising materials such as recipe books, or organize awareness raising events such as tasting sessions for native foods.

Monitoring and evaluation

The vastness of the Brazilian territory presented several challenges for the BFN project. Most of these challenges concerned the monitoring and alignment of results, as there were considerable differences among partners in terms of infrastructure, capacities and the ability to deliver within the given timeframe. To overcome these challenges, all activities were monitored continuously (e.g. on the basis of periodic reports, submitted every three to six months), initiatives were adapted to the needs and capacities of each region, capacity building workshops were organized, and clear standards and guidelines were established for food composition analysis and the development of recipes. Bureaucratic difficulties were encountered when formalizing regional partnerships and transferring financial resources (which did not always happen timely). The high turnover of technical personnel within partnering federal ministries and changes in the government's priorities required constant efforts by the project's national coordination committee to engage and lobby with the ministries.

The improvements brought about by the project – the expansion of the knowledge base on biodiversity native foods, the strengthening of the regulatory framework, the building of capacities and the raising of awareness about the nutritional relevance of biodiversity – undoubtedly increased the use and consumption of native edible species.

Looking ahead, the impacts of the project may be consolidated and amplified by:

- scaling up the activities implemented under the project;
- developing methodologies to rigorously assess the impact of the project's actions in terms of the increased conservation of native food species;
- increasing the general public's awareness of, and demand for, native foods; and
- stepping up the collaboration with the private sector; indeed, a greater engagement with small- and large-scale operators in the food and gastronomy sectors (e.g. restaurants), nutrition professionals and organizers of food festivals, among others, could contribute to the development of value chains for native species and promote the greater integration of these products into agricultural production systems.

This additional work requires a firm commitment on the part of national governments, as well as additional financial resources.

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13 MEASURING AND COMPARING THE CARBON FOOTPRINTS OF DIFFERENT PROCUREMENT MODELS FOR PRIMARY SCHOOL MEALS: ANALYSIS OF CASES ACROSS FIVE EUROPEAN COUNTRIES

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ABSTRACT

The study presented in this chapter sought to assess the sustainability outcomes of different procurement models for primary school meals services in five European countries. Based on environmental impact analysis, this chapter reports on the size and composition of the carbon footprints of the procurement models and analyses the contributions to overall carbon emissions of the various activities in the supply chains for meals services. It was found that while the transportation of food by suppliers to schools contributed somewhat to overall carbon footprints, other variables have a more significant impact, in particular the amount of meat on the menu and the choice of waste disposal method. The chapter concludes by discussing which actions stakeholders should prioritize to improve the environmental impacts of public food procurement. The research for this chapter was funded under European Union H2020 grant agreement 678024.

13.1 Introduction

In the growing body of scholarship that investigates sustainability in public sector food procurement, debates have focused on the different forms, or models, that procurement systems can take, and what the consequences of these are for sustainability outcomes (Morgan, 2008; Goggins and Rau, 2016; Smith *et al*., 2016; Grivens *et al*., 2018). In particular, procurement models oriented towards lowest cost are often criticized for being unsustainable (Morgan and Sonnino, 2007; Morgan, 2008) due to their perpetuation of industrial-scale, fossil fuel-reliant production systems, their geographically extended distribution channels and the low quality of food on the plate. Alternative procurement models advocated as more sustainable include those featuring greater localization and/or sourcing of organic food (Walker and Preuss, 2008; Nielsen *et al*., 2009; Sonnino, 2010; Jones *et al*., 2012; Lehtinen, 2012; Tikkanen, 2014). Such models are associated with less ecologically harmful production processes, lower food miles, more equitable supply chain relations and more nutritious food. In Europe, specific policy instruments have been developed in accordance with these principles. For example, Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on public procurement makes provisions to facilitate the procurement of more local and organic food, and thereby pursue enhanced sustainability outcomes.

Although the arguments in favour of alternative models are compelling, to date few studies have systematically examined and compared the sustainability outcomes of different models of public food procurement. The aim of this chapter is to address this gap. A three-year study conducted under the Strength2Food project, funded by the European Union,[1] examined the environmental, economic, social and nutritional outcomes of different models of food procurement across a set of primary school meals services in five European countries. This chapter focuses specifically on the investigation of the environmental impacts of the meals services. The research questions that guided the study were:

- Which activities contribute most to the carbon footprint of a school meals supply chain? and

[1] For more information on the Strength2Food project, see **www.strength2food.eu**. The research was funded under grant agreement H2020 678024.

- Do alternative procurement models, which emphasize sourcing of local or organic food, have lower emissions than low-cost models?

The sections that follow provide an overview of the meal services that were used as case studies and describe the methods used to measure their carbon footprints. The chapter then presents the results of the analysis and discusses the environmental sustainability implications for public food procurement policies and practices.

13.2 School meals services: case studies

In each of the five countries included in the study (Croatia, Greece, Italy, Serbia and the United Kingdom of Great Britain and Northern Ireland), a pair of school meals services was selected (see Figure 1). Each case meals service comprised the supply chain and catering activities through which meals were provided to a sample of five schools (or four schools, for the Serbian cases). For all of the countries except Italy, one of the two case studies concerned a local service model (LOC), whereby the contract award criteria referred explicitly to local sourcing and/or local suppliers accounted for a proportion of food purchased in practice.

The other case study for each country concerned a low-cost service model (LOW), whereby contract award criteria emphasized lowest price, with little to no mention of local sourcing. In Italy, where regional laws require a minimum of 70 percent of food procured for school meals to come from organic or integrated production systems, or to be typical and traditional products, one study case concerned a LOC-ORG model (a model operating according to these regional laws), while the other concerned an ORG model (a model in which the contract primarily referred to organic sourcing). See Chapter 7 and Chapter 27 for additional analysis of the Italian experiences, and Chapter 1 and Chapter 25 for experiences in the United Kingdom of Great Britain and Northern Ireland.

Of the many national and regional differences in procurement practices that existed across the cases, the following are helpful to contextualize the study. In Italy, public procurement policies have embraced the sustainability agenda. Combined with a well-elaborated regime to support high-quality food and nutritional standards in school meals, they provide a policy context that is highly conducive to localized

Figure 1 **Map of case studies of school meals services**

Source: map from UN Geospatial Information Section, adapted from Tregear *et al.*, 2019.

and organic procurement. The provision of school meals in Italy is organized at the municipal level. In the United Kingdom of Great Britain and Northern Ireland, there are frameworks setting nutritional standards for school meals and at least some encouragement of local and organic sourcing, notably through the Food for Life programme.[2] In Scotland, all school meals services are organized at the municipal level; the spatial scales of organization vary in other parts of the country.

In Croatia and Serbia, public procurement policies have to date focused less on sustainability. In Croatia, and specifically in the city of Zagreb, a mix of collective and individually organized contracts are used for high and low-quality goods, respectively, while in Serbia, individual schools are normally responsible for contracting their own

[2] For more information on the Food for Life project, see **www.foodforlife.org.uk**.

meals services. Croatia established national nutritional standards for school meals in 2013, while Serbia introduced such standards in 2018. Greece presents yet another, very different context. Until 2016, there was no public provision of school meals in the country. Their introduction in 2016 stemmed from a national social welfare programme targeting lower-income municipalities. Contracts are awarded according to the most economically advantageous tender (MEAT) framework. As schools in Greece are without kitchens or canteens, all meals are prepared off-site in central kitchens and transported in sealed containers for service in classrooms.

13.3 Calculation of carbon footprints

The core measure for the environmental impact of the meals services that were used as case studies was carbon footprint, expressed as the kilograms of CO_2e emitted annually from the production, processing, transportation and waste handling of food items procured by the selected schools in each case. The following paragraphs describe the approach that was developed, adapted from the method of Lancaster and Durie (2008), to calculate these emissions.

First, to calculate the emissions relating to the agricultural production, processing and upstream transportation of the procured food items, the delivery invoices sent by all suppliers to the schools in the case studies were collected for a minimum period of six weeks in 2017/18.[3] Based on these invoices, the total annual quantities (in kilogram) of food items procured in each case were estimated. These annual quantities were then multiplied by the relevant per kilogram emissions factors.[4] These calculations captured all emissions up to and including the transport to first-tier suppliers (i.e. wholesalers).

[3] The exception to this was Italy, where it was not possible to obtain invoices. Instead, food quantities were estimated based on documents supplied by the municipalities and catering firms regarding menu composition and food quantities for the school year.

[4] For all cases except the ones in Italy, the emissions factors proposed by Audsley *et al.* (2009) were used for fresh food items, those of Slater, Chalmers and Craig (2019) for processed items, and those proposed by Williams *et al.* (2006) for organic items. For the Italian cases, well-established and reliable databases providing emissions factors that are more specific to the Italian context were used, including the Double Pyramid database of the Barilla Center for Food and Nutrition (BCFN, 2016), the Environmental Product Declaration (EPD) database (EPD International AB, 2019), the LCA food database and the ecoinvent database (ecoinvent, 2019).

Next, the emissions relating to the downstream transportation of the food items were calculated, from first-tier suppliers to the schools included in the case studies, over a school year. Information was gathered through interviews with suppliers on their vehicle types, loads, delivery round distances and frequencies; then, the estimation formula of the Department of Environment, Food and Rural Affairs (Defra) was applied (United Kingdom of Great Britain and Northern Ireland, Defra, 2013).[5]

Finally, the emissions relating to the handling of waste were calculated. Over a period of two weeks (or one week, for the Greek case studies), all types of daily plate waste were collected and weighed in two schools for each case study. Based on these data, average annual plate waste was estimated for all schools in each case study. These estimates were multiplied with the waste handling emissions factors elaborated by Moult *et al*. (2018), which not only make a distinction between different categories of waste, but also between different waste destinations (emissions from landfill, for example, are much higher than those from anaerobic digestion, composting or the transformation of waste into animal feed).

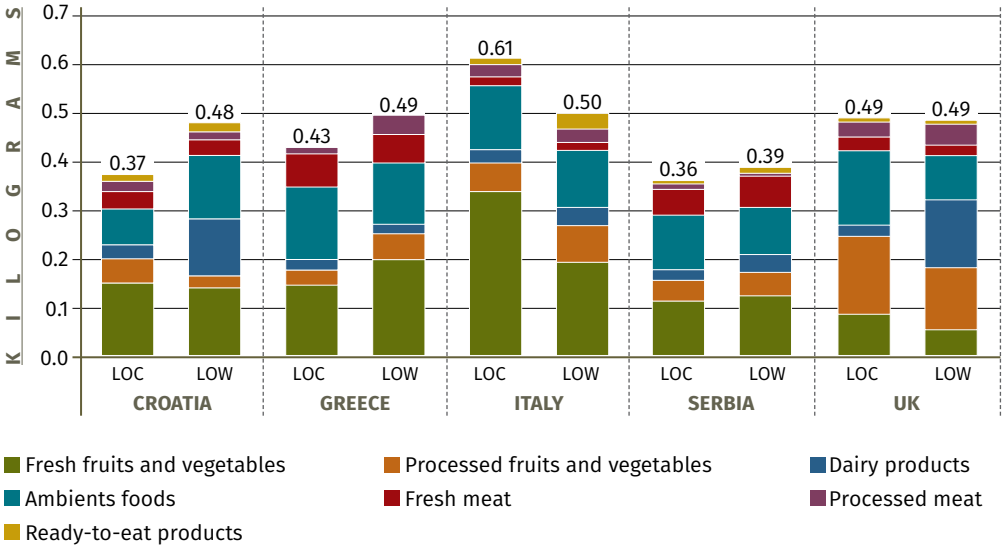
13.4 Results

Which foods were procured by the meals services that were used as study cases?

It is well-established that upstream production and processing activities make important contributions to the total carbon footprints of food supply chains; the magnitude of these contributions varies by type or category of food. Therefore, this study explored which foods were procured by the schools in the case studies, and in what relative amounts. Figure 2 summarizes the results, showing the types of foods and their relative weights per average meal. Note that the weights reported refer to the raw quantities of foods procured, before preparation and cooking, for the average meal, and not to the weight of the served meal.

[5] The formula used was the following (incorporating the assumption that 89 percent of the weighted average was allocated to the distance of the delivery round and 11 percent to the vehicle load) (Kellner and Otto, 2011):

Figure 2 **Weights and proportions of foods procured for the average meal in the meals services (kilograms per meal)**



Note: ambient foods include bread, pasta, rice and oils.

Source: Tregear *et al.*, 2019.

As Figure 2 shows, there was considerable variation between the paired cases, and across countries, in the total weights of foods procured for the average meal, from 0.61 kg and 0.50 kg (Italian cases) to 0.36 kg and 0.39 kg (Serbian cases).[6] Considerable variations were also found in the proportions of different food types making up these weights. In most cases, fruits and vegetables (fresh and processed combined) represented the largest category. However, their share in total meal weight varied from almost two thirds in the Italian LOC-ORG case to around one third in the Croatian LOW case. Notably, the cases in the United Kingdom of Great Britain and Northern Ireland showed the smallest proportions of fresh fruit and vegetables procured for the average meal, and the highest proportions of processed fruits and vegetables. Dairy products represented only a small proportion of total meal weight in all the cases, except for the Croatian LOW case and the LOW case in the United Kingdom of Great Britain and Northern Ireland. The higher proportions in those cases were due

[6] In some Italian schools, a proportion of the recorded fruit weight was served as a mid-morning snack instead of, or in addition to, the fruit served at lunch.

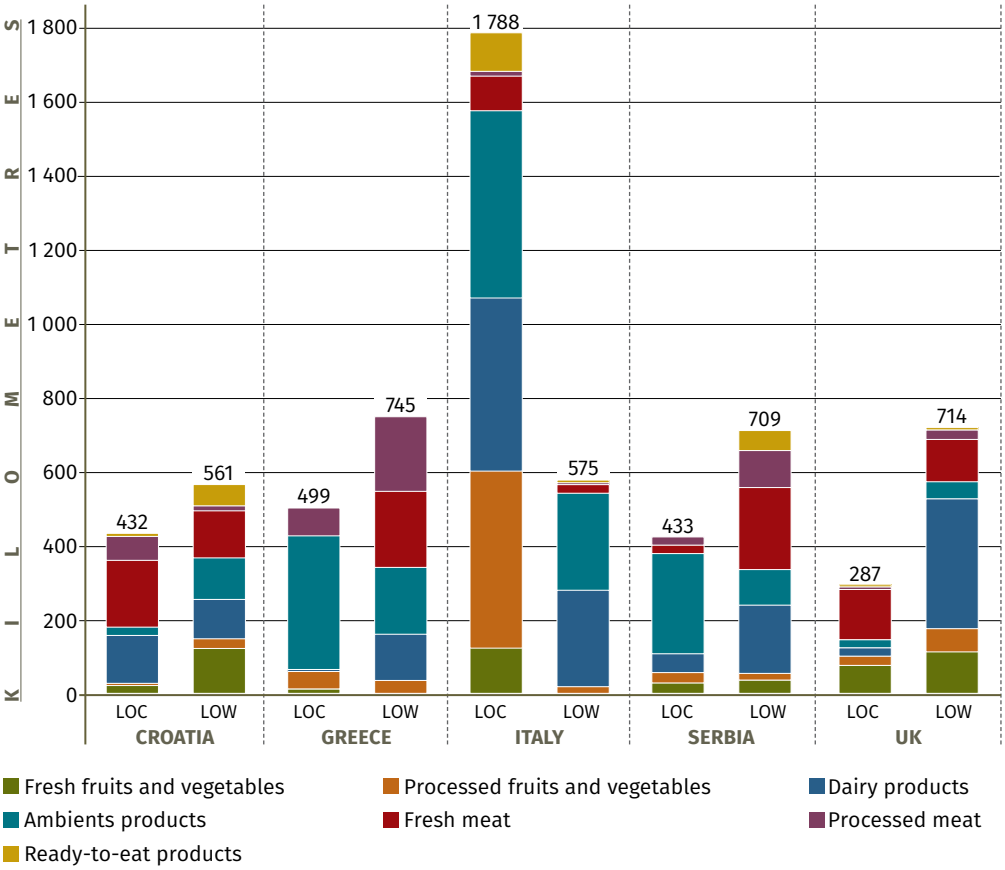
to the practice of procuring milk to drink with meals. Finally, variations are seen in the proportions of fresh meat across the cases, with the Greece and Serbian cases procuring noticeably more meat (including ruminant meat) than the other cases.

What were the transportation distances from first-tier suppliers to schools?

Food miles have long been a focus of attention in policies to improve the sustainability of public procurement. Hence, the study sought to estimate the transportation distances travelled by food suppliers for the case studies. Figure 3 shows the average weekly distances travelled by first-tier suppliers (i.e. wholesalers or equivalent end-chain suppliers) to the five schools in each case (or four schools, in the Serbian cases), based on their locations and the delivery frequencies. In order to make comparisons across cases, the total number of kilometres was divided by the number of weeks of delivery operations in a school year, as well as by the number of featured schools in the case, to obtain the average number of kilometres travelled per school per week. The estimates shown in Figure 3 depict the raw distances travelled, to provide a visual illustration and comparison. To estimate the emissions associated with these distances, factors such as the number of other customers in the rounds, shared loads and backhauling were taken into account.

As Figure 3 shows, in four out of the five case pairs, the kilometres travelled were smaller in the LOC case than in the other case. The Italian LOC-ORG case was an exception to this, due to the location of one or two key suppliers at a considerable distance from the central kitchen (e.g. canned tomatoes were transported from the Campania region, in southern Italy, to Parma). The distances between the locations of suppliers and of the central kitchen also explained the high number of kilometres travelled weekly in the Greek LOW case, where meat was transported from Germany. Other factors that influenced the number of kilometres travelled were the number of suppliers (e.g. the relatively high average number of kilometres in the Serbian LOW case were due to the relatively high numbers of individual suppliers making trips to the schools in an uncoordinated way) and the frequency of deliveries (the LOW case in the United Kingdom of Great Britain and Northern Ireland had the third highest average number of kilometres travelled due to the daily delivery to the schools of fresh milk for drinking).

Figure 3 **Average number of kilometres travelled by suppliers in the case studies of meal services (per school, per week)**



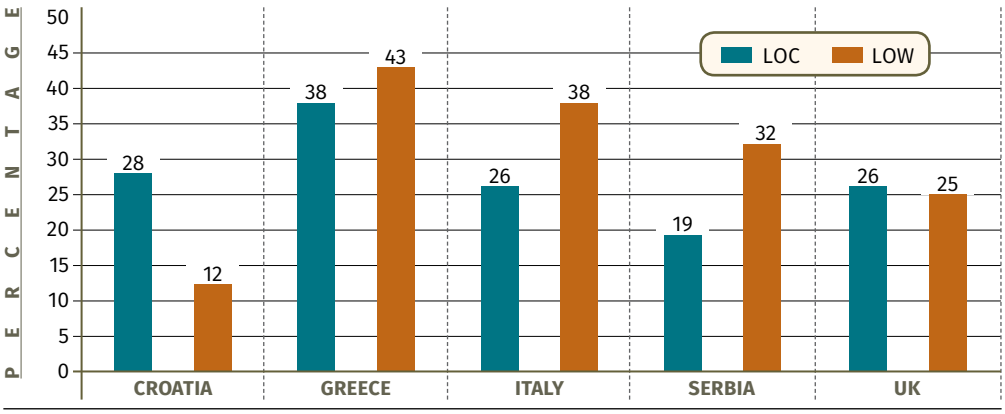
Note: ambient foods include bread, pasta, rice and oils.

Source: Tregear *et al.*, 2019.

What were the waste levels in the case study meals services?

Food waste is increasingly recognized as a significant environmental problem in public procurement (Sonnino and McWilliam, 2011), in addition to its implications for nutritional and financial losses. Hence, the study gathered data on the quantities and types of plate waste generated in the schools. Based on these data, the average plate waste generated in the schools, expressed as a proportion of the total food served, was estimated (Figure 4).

Figure 4 **Plate waste in the case study meal services, as a proportion of total food served**



Source: Tregear *et al.*, 2019.

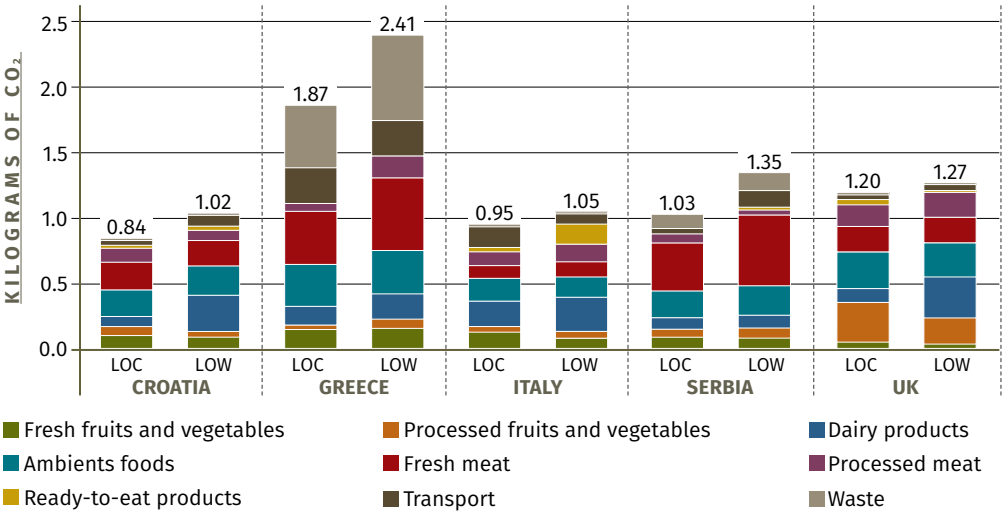
As Figure 4 shows, there was considerable variation within case pairs, and across countries, in terms of the percentages of served food that were wasted. The highest rates of waste were in the Greek LOW case (43 percent), the Greek LOC case (38 percent) and the Italian ORG case (38 percent). Meanwhile, the lowest rates were in the Croatian LOW and Serbian LOC cases (12 and 19 percent, respectively). In addition, data on the typical destination of the food waste were gathered. It was found that all cases relied exclusively on carbon-reducing waste disposal methods, except for the Greek (100 percent reliance on landfill) and Serbian cases (where a mix of landfill and composting/transformation into animal feed was used).

Carbon footprint of the case study school meals services

Having estimated the quantities and types of food procured by the meals services that were used as case studies, the related kilometres of transportation and the amounts and destinations of plate waste, the carbon footprints of the services were estimated. Figure 5 shows the total carbon emissions of the average meal in each meals service case study, along with the contribution of the different activities (production and processing per type of food, total transportation and total waste). Figure 6 shows the carbon intensity of the average meal in each case, that is, the kilograms of CO_2e per kilogram of food in the average meal. This latter measure is important for comparison

purposes within and across the case pairs, because it eliminates the variations in the total weights of average meals across the cases.

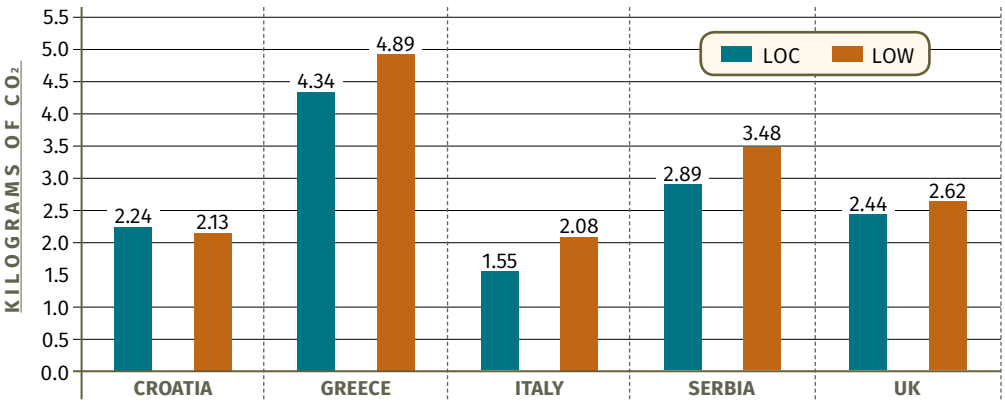
Figure 5 **Carbon emissions of the meals services case studies, per average meal (kilograms of CO_2e)**



Note: ambient foods include bread, pasta, rice and oils.

Source: Tregear *et al.*, 2019.

Figure 6 **Carbon intensity of the average meal in the meals services case studies (kilograms of CO_2e per kg of meal)**



Source: Tregear *et al.*, 2019.

Figure 5 and Figure 6 show that the two Greek cases had the highest carbon footprints per average meal, and per kilogram of meal. Indeed, according to the carbon intensity measure, the emissions of the Greek cases were more than double those of the case with the lowest emissions (Italy LOC-ORG). Figure 5 shows that the main contributors to emissions in the Greek cases were waste handling (due to the high waste levels and the exclusive reliance on landfill) and the use of fresh meat (which represented a relatively high proportion of the weight of the average meal). Waste disposal and meat consumption were also high contributors to emissions in the Serbian cases, which had the second-highest carbon intensities. Meanwhile, the Italian and Croatian cases showed the smallest carbon footprints. Per-meal emissions (see Figure 5) were lower in the Croatian cases; however, it should be recalled that in Italy, a much higher quantity of food was procured per average meal. When this variation is eliminated (see Figure 6), the Italian cases were found to have the lowest emissions per kilogram. Even on a per-meal basis, the low emissions of the Italian meals are striking. This demonstrates how the selection of the types of foods comprising the meals (in the Italian cases, a high proportion of fresh fruits and vegetables, and small amounts of meat) can have a strong carbon-reducing effect. The other key finding in Figure 5 that is worth highlighting is the relatively small contribution of transport emissions to the total carbon footprint in all cases, even those with a high number of kilometres travelled by first-tier suppliers. In particular, the Italian LOC-ORG case – where geographically distant suppliers were used – had the lowest carbon intensity of all cases.

13.5 Discussion

There is relatively little systematic evidence available as to the environmental impacts of public food procurement. Hence, this paper sought to explore: which activities contribute most to the carbon footprint of supply chains for school meals, and whether alternative procurement models, emphasizing localization or the use of organic food, have lower emissions than low-cost models.

Overall, the analysis found that across all cases, the greatest contributor to total carbon footprint was the **production, processing and upstream transportation** of the food items themselves, with emissions from those activities for meat (and in particular ruminant meat) being much higher than those for fruits and vegetables. By contrast,

downstream transportation, from first-tier suppliers to caterers/schools, contributed only a modest proportion of total emissions. Hence, the results indicate that the carbon footprints of public food procurement depend more on the composition of the meals than on the location of the suppliers. A further important finding is the **importance of the food waste disposal method for total carbon footprint**. In countries where methods with low carbon emissions such as anaerobic digestion, composting and transformation into animal feed are practiced (Croatia, Italy, the United Kingdom of Great Britain and Northern Ireland), waste disposal accounted for only a very small part of total emissions in all case studies – even in those cases with high rates of plate waste, such as in Italy. Meanwhile, in Greece and Serbia, where landfill is a common disposal method, waste accounted for much higher proportions of total emissions.

To answer the question of whether procurement models that feature local or organic sourcing have lower carbon emissions than low-cost models, a simple within-pair comparison of the case studies was carried out. This comparison revealed that for four out of the five pairs (Greece, Italy, Serbia and the United Kingdom of Great Britain and Northern Ireland), the LOC model had a lower carbon footprint than the LOW model. Furthermore, the Italian cases, both of which incorporated organic procurement, had the lowest carbon intensities of all cases. However, the analysis indicates that these differences were due to factors other than the specific localization and organic features of the models. As highlighted above, downstream transportation accounted for a relatively modest proportion of total emissions in all of the case studies, including LOW cases. Hence, any effect on emissions of localization is far outweighed by the effects of the types of foods procured and the waste disposal method chosen.

Similarly, the low emissions found in the Italian cases were due to their procurement of high proportions of fruits and vegetables and low proportions of meat, rather than to the organic status of these foods. In other words, even small increases in the amount of meat procured would greatly increase the emissions in both Italian cases, whether or not that meat was organic. Therefore, while localized and organic procurement models may be associated with – or could even promote – decision-making that makes environmentally friendly procurement and waste management choices more likely, the analysis points to the need for caution in attributing direct

causality between these specific procurement model features and beneficial environmental outcomes.

This is not to say that farm management practices, such as those associated with organic or low input farming, have no impact at all on the carbon emissions of meals services. On the contrary, according to measures used in other studies (e.g. the EX-ACT tool of the Food and Agriculture Organization of the United Nations [FAO]),[7] environmentally friendly agricultural practices could indeed lower the greenhouse gas emissions of school meals services, if those services have the same menu composition as their counterparts using conventionally farmed foods. However, the results of this study highlight that a greater impact on emissions can be had by adjusting the composition of menus, rather than farming practices.

13.6 Conclusion

From the results of this study, three recommendations can be drawn for policymakers and supply chain stakeholders that allow them to enhance the environmental sustainability of public food procurement.

First, it is recommended to focus on food waste disposal methods, and specifically to switch from landfill to a more environmentally friendly alternative (e.g. anaerobic digestion, composting or transformation into animal feed). The results of the case studies indicate that landfill disposal may account for up to one third of total carbon emissions in food procurement chains. Avoiding landfill can thus result in a dramatic reduction of emissions. To ease the switching between waste disposal methods, policymakers should improve the availability of anaerobic digestion/composting facilities. Meanwhile, procurement contracting authorities are encouraged to incorporate the use of such facilities in contract award criteria. Actions targeted towards the reduction of food waste should also be pursued, for example awareness raising about food waste among associations of supply chain actors and user groups. Awareness raising efforts could take the form of study tours or discussion forums to exchange experiences about minimizing waste in school canteens.

7 For more information on the FAO EX-ACT tool, see **www.fao.org/tc/exact/ex-act-home/en**

Second, it is recommended to make menu adjustments, and specifically to explore ways to reduce the use of ruminant meat, for example by substituting it with more white meat or fish or by introducing meat-free days in menu cycles. Increasing the proportions of fruits and vegetables, as well as of animal proteins that are less carbon-intensive (such as milk and eggs) would also result in a reduction of emissions. Such menu adjustments must be balanced against nutritional requirements and "plate appeal," which are particular concerns for school meals. Policymakers are encouraged to invest in more research on nutritionally sound low-carbon diets and menus; they should also implement programmes for the exchange of information and knowledge among nutritionists, menu designers, catering staff and pupils and parents, to ensure that the adjusted menus with a lower carbon profile are safe and appealing. For menus that have already been adjusted to include ingredients with a lower carbon profile, the attention can be shifted to procuring items from environmentally friendly farming practices; policymakers are encouraged to support and fund research into such practices.

Third, it is recommended to focus on transportation arrangements. Adjustments to those arrangements could involve sourcing items more locally (the transport emissions in the Italian and Greek cases, with their distant first-tier suppliers, were indeed higher than in other cases). However, in making such changes, authorities need to ensure that supply chains do not create a multiplication of short, local journeys as a consequence. Equal, or even greater, reductions in transport emissions may be obtained by switching to electric or more fuel-efficient vehicles, encouraging suppliers to share or backhaul deliveries, creating better coordinated local/regional transportation hubs or warehouses, and/or reducing the number of individual suppliers in the contract. Contracting authorities could promote these actions by allocating points to them in contract awards. Increasing storage capacities within schools (especially chilled and frozen storage) can also have the effect of reducing carbon emissions, as it allows for a reduced frequency of deliveries. However, such investments should be complemented with information and training efforts to ensure that kitchen staff understand the food safety implications of such storage methods.

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