

Food Quality as the Direction of Development for EU Agriculture

Systems for Producing Certified Food –
Goals, Opportunities and Limitations



'European Agricultural Fund for Rural Development: Europe investing in rural areas'

The project co-financed from the European Union funds under Scheme II of the Technical Assistance measure 'Polish Rural Network' of the Rural Development Programme for 2014–2020.

The Managing Authority of the Rural Development Programme for 2014–2020 – the Minister of Agriculture and Rural Development.

The content is supervised by the Foundation for the Development of Polish Agriculture.

**Food Quality
as the Direction
of Development
for EU Agriculture**

Food Quality as the Direction of Development for EU Agriculture

Systems for Producing Certified Food –
Goals, Opportunities and Limitations

Authors

Jacek Walczak · Monika Skowrońska · Beata Feledyn-Szewczyk

Andrzej Madej · Katarzyna Ratusz · Wojciech Krawczyk

Anna Dominiak · Przemysław Rządziejewicz

Scientific editors

Monika Skowrońska · Jacek Walczak

Authors

Jacek Walczak, *Institute of Environmental Protection – National Research Institute*

Monika Skowrońska, *University of Life Sciences in Lublin*

Beata Feledyn-Szewczyk, *Institute of Soil Science and Plant Cultivation – National Research Institute*

Andrzej Madej, *Institute of Soil Science and Plant Cultivation – National Research Institute*

Katarzyna Ratusz, *Warsaw University of Life Sciences*

Wojciech Krawczyk, *National Research Institute of Animal Production*

Anna Dominiak, *Agricultural and Food Quality Inspection*

Przemysław Rządziejewicz, *Agricultural and Food Quality Inspection*

Scientific editors

Monika Skowrońska, *University of Life Sciences in Lublin*

Jacek Walczak, *Institute of Environmental Protection – National Research Institute*

Reviewers

Prof. Robert Kupczyński, *Wrocław University of Environmental and Life Sciences*

Prof. Anetta Siwik-Ziomek, *Bydgoszcz University of Science and Technology*

Translation

Dorota Szmajda

Proofreading

Joanna Bilmin-Odrowąż

Cover design

Katarzyna Juras

Copyright © by the Foundation for the Development of Polish Agriculture (FDPA), Warsaw 2023

All rights reserved. No part of this publication may be copied, reproduced or distributed without the FDPA's prior written permission.

The views expressed here are those of the authors and do not necessarily reflect the official opinion of the FDPA.

ISBN 978-83-67450-60-7

doi 10.7366/9788367450607

The monograph titled *Food Quality as the Direction of Development for EU Agriculture. Systems for Producing Certified Food – Goals, Opportunities and Limitations* was prepared as part of the project: European Green Deal – Opportunities and Challenges for Polish Agriculture. 'European Agricultural Fund for Rural Development: Europe investing in rural areas'. The operation co-financed from the European Union funds under Scheme II of the Technical Assistance measure 'Polish Rural Network' of the Rural Development Programme for 2014–2020.

The Managing Authority of the Rural Development Programme for 2014–2020 – the Minister for Agriculture and Rural Development.

The content is supervised by the Foundation for the Development of Polish Agriculture.



Fundacja na rzecz Rozwoju
Polskiego Rolnictwa

Foundation for the Development of Polish Agriculture, ul. Gombrowicza 19, 01-682 Warszawa
phone: +48 22 864 03 90; e-mail: fdpa@fdpa.org.pl; www.fdpa.org.pl



INSTYTUT ZOOTECHNIKI
PAŃSTWOWY INSTYTUT BADAWCZY

Project partner: National Research Institute of Animal Production



Krajowa Sieć
Obszarów Wiejskich

Visit website at: www.ksow.pl. Become a partner of Polish Rural Network.
A free copy

Publication commissioned by the FDPA and issued by Scholar Publishing House, ul. Oboźna 1, 00-340 Warszawa,
e-mail: info@scholar.com.pl; www.scholar.com.pl



This publication provides a synopsis of the multi-author study entitled *Food Quality as the Direction of Development for EU Agriculture Systems for Producing Certified Food – Goals, Opportunities and Limitations*, published following the scientific conference organised by the Foundation for the Development of Polish Agriculture in Ostrołęka on 24–25 April 2023. The conference was funded by the Action Plan of the National Rural Network for 2014–2020 and the Operational Programme for 2022–2023. The monograph has eight chapters, which are expanded versions of the papers delivered at the seminar, and an addendum with supplementary materials.

The first chapter, entitled “Changes in Human Dietary Patterns and the Impact of Food on Society’s Health”, outlines the evolution of diets and their effects for health. It opens by emphasising that the capacity to secure, accumulate and store food has for centuries been a matter of survival for humankind. An analysis of how human nutrition has evolved over time reveals several stages closely interlinked with societal development. In the Palaeolithic Age, human gatherers ate fruits, berries, herbs, plant leaves and roots, insects, and bird and reptile eggs that they had found. Their diet was largely aligned with the seasons and the variety of foods offered by the immediate environment they lived in. When humans became hunters, they added meat to their diet.

With the Neolithic Age came the development of new skills by the human population, such as crop cultivation and cattle breeding. This made the fulfilment of dietary needs much easier and enabled the transition of human lifestyles from nomadic to settled. Over time, the evolution and popularisation of agriculture created the conditions for the growth of settlements and cities, and thereby the foundations for the development of human civilisation.

The ongoing urbanisation processes and increased demand for foods that would be available regardless of the season necessitated changes in dietary habits across societies. While the emergence of new technologies for raw materials processing, food storage, and food ingredient modifications significantly enhanced food security, it also meant a root-and-branch change in dietary patterns. The author emphasises that the so-called Western diet is consistently gaining currency in Europe, Poland and many other countries. It is characteristically rich in red meat, sweet desserts, high-fat foods, high-energy foods, full-fat dairy products, sweetened beverages, and highly processed “fast foods”. As such, it has a substantial energy and fat content, with saturated fatty acids, monosaccharides and salt, and is often poor in vitamins, minerals and fibre. The onset of the post-industrial era is associated with the use of unconventional food sources, novel food processing and preservation technologies, as well as new food production technologies.





Food Quality as the Direction of Development for EU Agriculture

A consequence of such changes in dietary patterns and food losing its connection with the environment is an unbalanced diet, which is surprising given the importance of nutrition in preventing many diseases such as overweight and obesity, osteoporosis, type 2 diabetes, cardiovascular diseases or atherosclerosis (hardening of the arteries). For this reason, in 2020 the World Health Organization (WHO) defined protecting societies from dangerous products such as foods with high contents of sugar, saturated foods and salt as one of the most urgent challenges for public health.

Such dietary issues also affect Polish society. Children in Poland are among those showing the fastest-growing obesity rates in Europe: in 2021, 35% of eight-year-olds struggled with being overweight or obese, and in 2020, 54.5% of adult Poles (64.2% of men and 45.5% of women) were overweight or obese, including approximately 10% suffering from obesity. Excessive body mass accounted for 14.2% of deaths in Poland.

Obesity is a major risk factor in other diet-related diseases such as type 2 diabetes. In 2018, 2.9 million adults in Poland had diabetes. An unbalanced diet can also lead to cardiovascular diseases such as arteriosclerosis, heart attack and stroke. According to the Statistics Poland (Pol. Główny Urząd Statystyczny) data, in 2021, cardiovascular diseases were the main cause of death, accounting for about 35% of all deaths in Poland. Similarly, more and more people are being diagnosed with osteoporosis, an illness related to calcium insufficiency in the diet – in 2018, more than 2.1 million people suffered from it. Given the increasing proportion of elderly people in the population, rising life expectancy and consistently higher calcium shortage in the diet, the number of people with osteoporosis is expected to increase.

The changes in the structure of the eating patterns observable over the years were corroborated by the reports “Health Status of Polish Population and Its Determinants”, published for 2020 and 2022 by the National Institute of Public Health – National Institute of Hygiene – NIPH-NIH (Pol. Narodowy Instytut Zdrowia Publicznego-Państwowy Zakład Higieny – NIZP-PZH). An analysis of its data highlights several key dietary issues of the Polish population.

Poles consume excessive amounts of monosaccharides. Even though the direct consumption of sugar in households in 2010–2020 fell, Poles ate considerably greater quantities of confectionery and pastries (by 35% and 40%, respectively). They also eat too much red meat, particularly processed meat. The years 2010–2018 saw a huge (over 120%) increase in the consumption of red meat and cold meats (0.66 vs 1.49 kg/person/month), sources of undesirable salt and saturated fats. Salt consumption at 10.3/day (2018) was over twice the recommended daily intake (5g/day).

6

At the same time, poor eating patterns in Poland result in deficiencies of certain substances. The diet has too little fibre, which comes mainly from vegetables and vegetable products and whole-grain cereal products (bran, cereal, wholemeal and whole-grain bread), the consumption of which is falling steadily. Although the intake of fruit and fruit products has increased (by about 12% in 2010–2020), it should be borne in mind that fruit preserves (such as juices, jams, and



A Summary

confits) are also sources of monosaccharides, that is substances which ought to be consumed on a much lesser scale.

The consumption of fish and fish products in Poland is also undesirably low, and in the years 2010–2020 fell approximately by another 40% (0.45 compared to 0.27 kg/person/month). Among others, this can lead to insufficient amounts of unsaturated fatty acids, particularly omega 3 acids, which cannot be synthesised by the system and therefore need to be supplied in the diet. Changes in eating patterns have also shrunk the content of other valuable nutrients in the diet, such as calcium, magnesium and iron, vitamins D and C, and folates.

The dietary patterns in present-day Poland are clearly at odds with the recommendations published by institutions that promote healthy eating habits. Although many people increasingly seek ways to redress that imbalance, unfortunately, this is not necessarily based on informed expert advice. The overwhelming abundance of information that is often contradictory and difficult for an ordinary person to prove or disprove can result in the eating disorders becoming even more acute. In their search for fast and spectacular effects, people try out “super diets” or decide to include “superfoods” in their menus.

Several dietary trends can be observed in recent years: the elimination or reduction of meat and animal-derived products in the diet (vegetarianism, veganism, flexitarianism), forgoing gluten and lactose, and an increased interest in organic, local, low- or unprocessed foods. It is also becoming increasingly popular to avoid food wastage (*zero waste, less waste*). There are more and more enriched products on the market which are intended to make up for nutritional deficiencies in large populations. In Poland, food supplements are extremely popular: as sources of concentrated vitamins, minerals or other active substances, they are aimed at complementing individual diets. However, even though the intake of such substances ought to be soundly justified and well-considered, they tend to be overused.

Due to the need to ensure food security and safety for the ever-increasing human population, the agri-food market has a major impact on national economies. At present, we, as consumers, can enjoy the benefits of a wide and diverse assortment of foods. Food processing plants are sometimes dubbed “food factories” owing to their large scale of production. In Poland, the food sector is one of the leading and fastest-expanding branches of the economy. In 2020, the value of its production sold totalled EUR 53 billion, and the sector’s share in overall industrial output reached 26% (share in the total production sold).

The chapter closes with the conclusion that food quality is a vital factor for the competition in the food sector, and that ensuring a high level of food quality and safety in the entire “farm to fork” food chain is becoming a priority for enterprise operations. It is of crucial importance to maintain all standards that aim to provide safe products in physical, chemical and microbiological terms, provided with clear labelling so as to enable consumers to make informed choices.





Food Quality as the Direction of Development for EU Agriculture

In parallel, the changing demographic and environmental conditions encourage seeking new sources of food and innovative technologies for its processing and preservation. Our tables more and more frequently host novel food products, made from ingredients or with technologies not used for this purpose before 1997. Plant-based meat substitutes are also enjoying a surge in popularity.

Recent research increasingly focuses on new methods of food production. Some of the retail markets have already seen the advent of cultured meat (“cellular meat”, “in-vitro meat”). It is assumed that, in the near future, the production of such cell-cultured chops will require less water, less acreage for fodder production, and – last but not least – will generate less waste.

The next chapter, titled “Classification and Examples of Hazards to the Health Quality of Food”, offers a classification of those food factors that can have negative consequences for human health. The author noted that satisfying hunger and the need for security are ranked first in Abraham Maslow’s Hierarchy of Needs, and that hazard-free food can fulfil these needs. The most common hazards (physical, chemical and biological) are increasingly accompanied by so-called “new emerging hazards” such as those related to the SARS-CoV-2 virus (coronavirus) or global warming.

These days, being risk-free is an integral part of food quality, with consumers paying more and more attention to this aspect when making their shopping decisions. Importantly, the protection of the public against hazards associated with the health quality of foodstuffs represents one of the key policy priorities of the EU, whose food is perceived as one of the safest in the world.

The main food-related physical hazards include foreign bodies that get into food:

- from raw materials (leaves, shoots, stones, pips, shells, bones, insects, sand, pebbles, soil)
- during the production process (glass, plastics, wood or metal pieces, nails, machine elements)
- due to staff omissions or neglect (hair, buttons, jewellery items, keys, coins)
- due to failure to observe GMP principles (glass from lamps, plaster).

It is stressed that the health hazards associated with the presence of physical objects in food mainly include mouth and digestive system injuries, and choking; such objects can also potentially act as carriers enabling the growth and transmission of pathogens and pollutants.

In the next part, the author defines chemical hazards as substances that can harm human health and come from:

- a) the environment (heavy metals, polycyclic aromatic hydrocarbons, dioxins);
- b) food production processes:
 - agricultural measures (nitrates, pesticides)
 - animal treatment (antibiotics, veterinary medicines)
 - food processing (polycyclic aromatic hydrocarbons, N-nitrosamines, acrylamide)



A Summary

- cleaning agents and sanitisers (detergents, disinfectants)
- packaging or containers (bisphenol A).

Chemical compounds can harm the human body in a variety of ways, producing – among others – carcinogenic, genotoxic, mutagenic, teratogenic, immunotoxic and cytotoxic effects.

The biological hazards (macro- and micro-) include pathogenic microorganisms and saprophytic parasites (protozoa, flukes, tapeworms, nematodes), pests (mites, nematodes, insects, rodents) as well as pathogenic and saprophytic microorganisms.

The chapter then discusses microbiological hazards which, as defined by the International Commission on Microbiological Specifications for Foods (ICMSF), refer to unacceptable contamination of food, growth or survival of foodborne microorganisms that could lead to its spoilage or production and proliferation of toxins, enzymes or their metabolic products. The microflora of foodstuffs includes both saprophytic microorganisms that cause food spoilage as well as pathogens that cause disease symptoms and can lead to death in extreme cases.

Diseases caused by foodborne microorganisms are typically classified as:

- contagious diseases, i.e. those caused by the entry and proliferation of pathogenic microorganisms across the system, leading to the emergence of characteristic local symptoms in the infected human organism
- systemic and food poisoning, i.e. infectious or toxic diseases contracted following the intake of food or water.

Physical, chemical and biological hazards can appear throughout the F2F chain. For this reason, the health quality of foodstuffs must be secured at every stage, from primary production through processing, storage, distribution, and sale up to consumption. This is done using dedicated measures in the form of internal production supervision, and external (official) supervision at both national and European levels.

A major Europe-wide component of the food safety chain is RASFF (Rapid Alert System for Food and Feed), which ensures the exchange of information about the identified food and feed risks and the counteracting measures between the Member States. The most frequent food safety risks concerning products from Poland and reported to RASFF are related to the presence of the dangerous *Salmonella* primarily in chicken meat and chicken meat products, other than chicken meat and meat products, and eggs. Importantly, microbiological hazards (pathogenic microorganisms) prevail in foods of animal origin, as compared to mycotoxins in plant products (cereals and bakery products) and pesticide residues in fruit and vegetables.

Since hazard-free food is among the vital factors necessary to ensure human life and health, it attracts the interest of food producers and distributors, national governments, international organisations and the scientific community alike. Although foodstuffs may contain substances





Food Quality as the Direction of Development for EU Agriculture

that have a detrimental effect on the human body, we can minimise the associated risks if the origin and characteristics of such substances are known. Nevertheless, it should be borne in mind that all the measures undertaken in primary production, processing, storage, distribution and sale to guarantee the health and safety of food do not release consumers from the responsibility of making informed shopping decisions and safely preparing food.

The chapter titled “The Quality of Foods in Poland – IJHARS Supervision and Control” summarises the goals, structure and remit of the Agricultural and Food Quality Inspection (Pol. Inspekcja Jakości Handlowej Artykułów Rolno-Spożywczych – IJHARS). First, the author notes that all IJHARS legislative and control activities focus on the protection of consumers’ health and economic interests. Therefore, the quality of foodstuffs is essentially examined from a dual perspective, taking into account their health (sanitary, veterinary and phytosanitary requirements) and quality aspects (commercial quality requirements).

Agricultural and food products available on the market – ranging from raw materials to ready-to-eat products, including foodstuffs and feeds for pet animals – must meet the requirements laid down in the applicable regulations and stated by the producers. Consumers who decide to buy such products need to be certain that they are neither harmful nor falsified. IJHARS plays a crucial role in combating food fraud.

The enacted legislation defining commercial quality is primarily intended to counteract all actions which may infringe on consumer rights, including the right to protect consumers’ economic interests, and the right to reliable and accurate information. Above all, the regulations in force lay down the general labelling principles for all agri-food products (both packed ones and those sold without packaging) and, for some (e.g. poultry, olive oil, honey, cocoa and chocolate products, fresh fruit and vegetables), define the mandatory quality requirements. Food business operators can also apply Polish Standards (Pol. Polskie Normy – PN) – optional quality requirements developed by the Polish Committee for Standardisation (Pol. Polski Komitet Normalizacyjny), and/or Codex Alimentarius, a collection of food standards developed by the FAO/WHO Codex Alimentarius Commission.

The harmonisation of requirements and standards at the legislative (mandatory) and standardisation (optional) levels in the field of production technologies, the quality of agri-food products and methods for their laboratory testing can significantly boost consumer confidence in marketed products and facilitate trade (including international trade).

Building consumer confidence in the quality of agri-foods available on the market is one of the pillars of the European Union’s food policy. It is being done both through legislative measures and diverse promotional and information initiatives. Cultivating regional traditions related to food production is considered important as they can largely help preserve individual local cultural identities.



A Summary

The author also notes that products manufactured as part of the EU systems: “protected designations of origin” (PDO), “protected geographical indication” (PGI), and “traditional specialities guaranteed” (TSG) are subject to strict and specific requirements, verification, and protection. To date, the European Commission has registered 47 Polish products in these categories: 27 PGIs, 10 PDOs, and 10 TSGs.

IJHARS takes an active part in enforcing compliance with applicable PDO, PGI and TSG regulations. These measures include first and foremost inspections of the compliance of the production process with the specification and elimination from trade of products whose labelling unlawfully uses the registered trademark reputation. IJHARS also provides supervision over the certification bodies authorised by the minister competent for the agricultural market to carry out inspections, and issue and revoke certificates confirming the compliance of the production process with the product’s specifications.

Many initiatives are being undertaken at the national level to support and promote the concept of local consumer patriotism and products with distinctive quality features. These include for example the “List of Traditional Foods” maintained by the Minister for Agriculture and Rural Development or the optional introduction of labels to distinguish Polish agri-foods having specific qualities (such as “Produkt Polski” [Polish Product] or “Poznaj Dobrą Żywność” [Try Fine Food]).

By discharging its statutory tasks, IJHARS has for two decades now protected consumers, identifying agri-foods of insufficient quality and preventing unfair competition in the agri-food market (including food fraud). The extensive scope of IJHARS competencies predominantly includes supervision over the commercial quality of agri-foodstuffs in their production and trade (including international trade). The Inspection focuses its efforts on the identification of fraud based on laboratory test results (e.g. undeclared or forbidden components) and by the verification of all information concerning the inspected products for their compliance with the statutory requirements and producer’s declarations.

As part of its scheduled inspections, in 2022 IJHARS inspected several dozen agri-foodstuff categories. Even though only single batches were found questionable in terms of organoleptic characteristics, the share of irregularities reached a record 3.6%. The conducted laboratory tests revealed 12.3% non-compliant product lots, and one in four lots was incorrectly labelled. The percentage of irregularities varied across individual commodity groups and individual inspection stages; 0.6% of fresh fruit and vegetable lots and 0.5% lots of potatoes did not meet the quality criteria, and their labelling was incorrect in 23.0% and 30.2% of the inspected lots, respectively. As regards pet food, 40% of the inspected lots were contested, and nearly one-third of the lots revealed labelling irregularities.

In summary, the author concludes that the changing social, economic and environmental conditions (such as increased production, international trade and consumer awareness) bring





Food Quality as the Direction of Development for EU Agriculture

new challenges faced by the participants of the agri-food chain and official control bodies. This situation forces them to cooperate, embark on various legislative and information activities, and step up (self)-inspection. For this reason, IJHARS will continue its “control and education” mission, and strengthen its cooperation with other institutions to ensure fair market practices and guarantee a high level of consumer protection.

The chapter titled “Domestic and Community Food Quality Systems” offers contemporary definitions of food quality and describes the food quality systems currently in place. The author has underlined that the concept of food quality as legislated by the EU, FAO and WHO draws on an intricate and multidimensional concept informed by a broad range of situational and contextual factors. In such an approach, “quality” denotes the whole of expected organoleptic and nutritional characteristics, the resultant benefits, and the desirable features that could warrant the food’s added value, e.g. forms of production (organic farming, environmental concerns and animal welfare), areas of production (designation of origin), and the underlying traditions.

Under ISO 9001 and 22000, “quality” refers to all the characteristics and features of a product or service that can affect its capacity to fulfil explicit or implicit needs. In this context, food safety is often confused with food quality. While the former is undoubtedly a necessary prerequisite, it is one of many conditions defining quality.

It is stressed that both mandatory and optional labelling practices can lead to some confusion in the identification of the origin of foodstuffs. The EU has uniform provisions regulating the overall manner of food labelling and minimum information required on the packaging. They are enshrined in Regulation (EU) No 1169/2011 (FIC Regulation) on the provision of food information to consumers. Most of these provisions entered into force on 13 December 2014, except the section on the provision of nutrition declaration, which was enacted on 13 December 2016. An example is the mandatory labelling of eggs for consumption that takes into account the maintenance systems for laying hens and organic farming.

According to Eurobarometer polls (2016), 83% of consumers make shopping decisions based on food quality, and 87% of them are willing to pay extra for food due to environmental protection concerns. While 41% of consumers take an intense interest in the poor living conditions of animals, for 94% of respondents, the price is the main shopping criterion, and 91% of them prefer to buy fresh products with proven quality. According to EIT Food (2020), a total of 62% of respondents regarded the products they purchased as tasty, while only 16% did not.

Regulation of the European Parliament and of the Council No 1151/2012 of 21 November 2012 establishes the quality schemes for agricultural products and foodstuffs, which provide the basis for the designation and protection of those names and indications that describe or indicate agricultural products with value-adding characteristics or attributes. The EU’s food quality systems include in particular, designations linked with products’ geographical origin and traditional specialities. These refer not only to protected designations of origin (PD), protected



A Summary

geographical indications (PGI) and geographical indications (GI), but also to organic farming, mountain products and products from the EU's so-called most remote regions.

The Regulation also defines the procedure for establishing a food quality scheme. First, a stakeholder group needs to be formed since the Regulation's provisions are addressed primarily to groups, e.g. producer groups, although in exceptional cases natural persons can also act as stakeholders. As the next step, the product needs to be identified under the provisions laid down in the Regulation. Finally, an original labelling must be developed for the product, which is then notified to the relevant public body delegated to operate the quality schemes.

Interestingly, the product's name cannot refer to the names of plant varieties or animal breeds. Therefore, in the case of e.g. the Spanish Iberico pig breed, the information on its content in the product is provided separately, and the product itself is marked as PGI. Certification comes at the next stage, and can then be followed by production and placement on the market.

Products with geographical designations account for 15.5% of total agri-food exports from the EU, with wines remaining the key product both in terms of total sales value (51%), and non-EU trade (50%). Research has found that farms participating in the quality schemes increased their income by as much as 32% compared to ordinary production. This suggests that quality schemes can offer a serious alternative to small and medium-sized family farms by ensuring their economic stability.

The EU's quality schemes also allow for the functioning of both national and private systems that need to comply with the requirements set out in the Regulation. In Poland, these are state-owned schemes such as Integrated Plant Production [Pol. Integrowana produkcja roślin] or Quality Production [Pol. Jakość Tradycja], and many privately operated systems, including QMP, QAFP or PQS. There are also many private quality schemes, operating both within agriculture and the processing sector, such as GLOBALG.A.P., FSA, BRC, IFS, and Rolnictwo Zrównoważone [Sustainable Agriculture].

One such arrangement is Fairtrade, a system for the certification and labelling of fair trade products. To obtain a Fairtrade certificate, a product must be manufactured by an organisation that is typically a production cooperative or an enterprise located mainly in developing countries and acquired by a partner or partners from a developed country. Sustainable farming products can be certified through the FSA (Farm Sustainability Assessment), another global system, based on a list of online questions prepared by the SAI Platform. The underlying audit includes an interview on the size of the farm, its crops and its mode of management, followed by questions concerning the use of plant protection products (PPPs), fertilisers, financial stability, social responsibility, and environmental safety.

GLOBALG.A.P. is predominantly a standard for the procedure preceding processing. A GLOBALG.A.P. certificate guarantees the consumers of agricultural products that these





Food Quality as the Direction of Development for EU Agriculture

products are safe, and manufactured using adequate PPPs and sustainable fertilisers, while respecting the needs of the natural environment. GLOBALG.A.P. certificates are issued for two parties: the farmer, and the businesses involved in the entire supply chain. In such countries as Austria, Chile, Denmark, France, Germany, Japan, Kenya, Mexico, Italy, New Zealand, Spain, and the United Kingdom, GLOBALG.A.P. has been incorporated into the national standards in the form of joint public and private partnerships.

GLOBALG.A.P. provides certification for all agricultural operations and means of production up to the moment the product leaves the farm. The relevant standard comprises the crop supply chains, farm animals and aquaculture. One of the standard's modules is GLOBALG.A.P. IFA (Integrated Farm Assurance), and the certification process comprises food safety and identifiability, environmental impact, health, safety and the welfare of staff, animal welfare, integrated crop management (IMC), integrated pest control (IPC), quality management systems (QMS), and Hazard Analysis and Critical Control Points (HACCP).

In addition to the global systems listed above, several other private standards are applied in the European Union. As a rule, such standards target one specific issue and the accompanying methods of agricultural production, e.g. GMO-free foods whose certification also encompasses agricultural crops. New designations concerning GHG emissions and climate change are spawning. However, they remain in the nascent phase of EU or NGO projects and have had a rather limited effect, not being, as yet, officially recognised as measures of mitigation at the EU level.

There are situations when one large food market can impose its requirements on suppliers and manufacturers, thereby forcing their production to comply with a specific system. This is the case of the United Kingdom and its Red Tractor assurance scheme that European suppliers must abide by. Similar interdependencies can be observed in the restaurant sector: the catering businesses not only have some global brands in their portfolio, but they can also force their suppliers to comply with specific low-emissions or improved farm animal welfare requirements. Furthermore, such company policies and product quality need to be communicated to consumers through adequate advertising.

The author concludes that viewing the notion of food quality only against a broad spectrum of activities aimed to ensure its safety is a flawed approach. Safety is a substantial but not the sole component of what makes up food quality. On the other hand, food with unverified safety cannot be regarded as a high-quality product or even placed on the market. The development of quality control systems at processing plants, their rigorous enforcement and the introduction of certification requirements in the operations within the processing sector have practically led to safety being considered as the only attribute of quality.

Most likely, food quality schemes and their arrangements will soon comprise products from improved animal welfare conditions (in some Member States, these already operate as



A Summary

registered, state-run quality schemes). Next in line are carbon farming, zero-carbon, GMO-free products, etc., with the expected clear dominance of organic production, which, according to the (F2F) strategy, is to be pursued in as much as 25% of the EU's cultivation area. However, given the current financial crisis in the sector as well as food security and safety issues, a touch of scepticism is recommended whether the attainment of that objective lies within the bounds of possibility.

The chapter entitled “The Role and Operation of the Food of Protected Origin in the EU” discusses practical solutions related to the food of protected origin schemes both in the EU and in its individual Member States. First, it states that one of the objectives of the Common Agricultural Policy (CAP) for 2023–2027 aimed at satisfying consumer expectations is the production of higher-grade foodstuffs and providing assistance to their promotion. These objectives are in line with the European Green Deal (EGD) strategy, one of whose priorities stipulates the establishment of a safe food production system. This priority, put forward in the (F2F) initiative, is to be achieved e.g. by limiting the use of fertilisers, pesticides and antibiotics.

These ambitions are expected to be fulfilled by sustainable food production, ensuring food security and balanced nutrition, and will involve certain obligations concerning product labelling, information on food origin and quality, and prevention of food falsification. Such activities emphasise the role of food quality and food certification, and have a significant impact on consumer awareness. Consumers tend to seek distinctive, unique products with specific quality attributes, around which the brand's history and manufacturing traditions are built. The consumers' wishes have been reflected in the European legislation promoting the production, certification, distribution, and promotion of high-quality food.

In the 1990s, the European Union adopted several legal acts extending special protection to producers who manufacture food of outstanding quality and with attributes associated with their geographical area and traditions. To emphasise their unique character, the EU came up with a European designation system aimed at informing buyers of the high quality of the products concerned and their being protected against fraud. Drawing on the French and Italian provisions concerning the *appellation d'origine contrôlée* (AOC) and the *denominazione di origine controllata* (DOC), in 1992, protected designations of origin (PDO), protected geographical indications (PGI) and traditional specialities guaranteed (TSG) were incorporated into the product labels.

Producer groups play a dominant role in the quality schemes for PDO, PGI and TSG products as they can register such products and oversee their protection and compliance with their technological requirements.

Polish products can be submitted for registration by the European Commission under the Act of 9 March 2023 on the Registration and Protection of Designations of Origin, Geographical Indications and Traditional Specialities Guaranteed of Agricultural Products and Foodstuffs,





Food Quality as the Direction of Development for EU Agriculture

Wines or Spirit Drinks and on Traditional Products. One important aspect of producer group operations is their activity aimed to enhance the effectiveness and functionality of their quality systems, promotion and positioning of PDO, PGI and TSG products on the market. The group's task is also to ensure fair competition between the manufacturers of such products and increase their credibility in consumers' eyes.

Producer groups in such countries as Spain, Italy, France, or Portugal operate systemically and regularly, as managers of several, a dozen or several dozen geographical designations. This is possible, among others, thanks to detailed additional regulations adopted in those countries (Spain, Italy, France), whilst in other countries the involvement of producer groups in such management is not regulated. In effect, these products are not managed in a proper, systemic manner, and producers act jointly only when applying for the registration of a given product while neglecting its promotion, distribution, or legal protection later on. If adequately managed and operated, quality systems will generate better profits both at the stage of manufacturing and sale of a given product.

Spain can be viewed as a country with exemplary arrangements concerning the quality of geographic indications. The Origen España association, established in 2008 and bringing together over 50 producer groups that register PDO and PGI products, represents the sector of protected-origin food, champions its rights, and organises promotional and marketing activities. One of its member groups, which is now chairing the association, is Consello Regulador de Carne de Vacun de Galicia – the Regulatory Board of the Galician Beef, a body that controls and coordinates two PGI products: Ternera Gallega and Vaca Gallega/Buey Gallego. In 2018, the group organised over 7,000 farms, 20 abattoirs, and 60 meat wholesalers, and its sales totalled 21,000 tons of Ternera Gallega veal, valued at EUR 122 million.

In Portugal, in 1992, the ACBM – Associação de Criadores de Bovinos Mertolengos – an association of Mertolenga breeders, began the small-scale sale of this cattle breed while controlling the entire process from production to sale. Two years later, and with the ACBM's support, a producer group set up Mertocar – Sociedade de Produtores de Carne de Qualidade, the first company that would offer large-scale sales of Mertolenga meat. To guarantee the origin and quality of their product to consumers, Mertocar, assisted by Portugal's Ministry of Agriculture, submitted an application for the registration of the designation of origin for Mertolenga beef under the name: Mertolenga Beef PDO, which was recognised by the EU in 1996, and named the ACBM the private-owned control and certification body.

Several years on, control and certification were accorded to an external, independent entity Certis – Controlo e Certificação. In 2006, Mertocar ended its operations, and the producers set up another company, Promert – Agrupamento de Produtores de Bovinos Mertolengos. The prices offered to the producers by Promert are attractive to them being higher than the market prices paid for the same type of beef carcass. Moreover, payments are made on time by the



A Summary

contractual deadlines, a factor which carries great significance for the producer groups and encourages them to engage in such cooperation.

The Parmigiano Reggiano cheese, an Italian PDO product, as of 1996 is produced in mountain areas, and therefore exemplifies a product that combines a PDO geographical indication with the optional quality of a “mountain product”. In mountain areas, it is produced in 110 dairies and over 1,200 farms (the Apennines region in the vicinity of Parma, Reggio Emilia, Modena, and Bologna). To ensure more sustainable development of the mountain areas and furnish consumers with additional guarantees of both the origin and the superior quality of Parmesan, the Parmigiano Reggiano consortium initiated the project entitled: “Mountain Product – A Quality Improvement Project”. The project stipulates that the Parmigiano Reggiano cheese will be made entirely from milk obtained in farms situated in mountain areas, from cows fed on fodder coming in 60% from mountain areas.

The cheese is made in dairies located in the mountains, and its ageing process lasts at least 12 months in the mountain areas. The stages of quality selection, sensory evaluation, and chemical analysis take place after 24 months, in the form of the “tapping” assessment by the experts. These activities can increase the cheese’s retail price by EUR 2 to 2.50 per kilogram than that of the standard Parmesan, while in wholesale, it can secure prices per kg from EUR 0.20 to EUR 0.40 higher.

Another efficient system aimed at protecting the quality of Italian cheese has been put in place by the consortia in the Veneto region, operating since the 1960s. They were organised to protect the production chains of such cheeses as Provolone Valpadana, Grana Padano, Asiago, Monte Veronese, Montasio, Piane, and Casatella.

In 2017, the estimated value of sales of PGI/TSG products totalled EUR 77.1 billion (EUR 74.8 billion excluding TSGs), of which wines represented 51% (EUR 39 billion), agricultural products – 35% (EUR 27 billion), spirit drinks – 13% (EUR 10 billion), and aromatised wine products – 0.1% (EUR 43 million). Since 2010, the total value of GIs/TSG sales has grown by 42% (37% excluding TSGs). Five Member States: France, Italy, Germany, United Kingdom, and Spain, recorded sales of GI products exceeding EUR 5 billion each. The total value of exports (intra-community trade and export to non-EU countries) of GI/TSG products was estimated at EUR 32.10 billion, which accounted for 42% of total sales in 2017 (20% within the EU and 22% exported outside the EU). Ultimately, in 2017 the value premium over the world prices totalled EUR 40 billion and was higher by 38% in comparison to 2010.

The last chapter, entitled “The Economic Efficiency of Organic Production as Compared to Conventional Production” summarises the findings from the research on the economic efficiency of organic and conventional farming at two levels: field/crops, and the production system/crop rotation system.





Food Quality as the Direction of Development for EU Agriculture

The authors emphasise that the present and future development of organic farming is closely linked with its ability to generate profit and be competitive vis-à-vis other systems of agricultural production. At present, the EU agriculture remains under the influence of new strategies, such as the EGD, F2F, and the EU Biodiversity strategy; all these initiatives obligate the Member States to considerably increase their land under organic farming (up to 25% of agricultural area by 2030).

The agricultural sector in Poland is now in transition between the Rural Development Programme 2014–2020 and the new Strategic Plan for 2023–2027, focusing its activity on securing tools for the development of agriculture that is environmentally friendly and economically profitable. Organic farming can provide the answer. Policymakers, administration, experts and farming practitioners show interest in the findings from research comparing the profitability of organic and conventional agricultural production. To meet this demand, economic studies on the comparison of agricultural production systems in the context of new challenges posed by the EGD were conducted, using the example of a well-established, model farm operated by the Institute of Soil Science and Plant Cultivation – State Research Institute (IUNG-PIB) in Osiny near Puławy.

The effectiveness of the organic and conventional systems was compared at two levels for the period 2019–2021:

1. The field/cultivated plants (mostly cereals grown in the organic and conventional systems);
2. The production system/crop rotation (whole crop rotations as a model of field organic and conventional production, based on the many years of experience of the IUNG-PIB in Osiny).

The economic calculation was based on: revenues from the sale of crops; direct costs and elements of indirect costs; labour inputs and other revenues, including grants and subsidies. This provided the grounds for calculating the gross margin and profitability ratio; these measures helped compare the economic efficiency of the organic and conventional systems of agricultural production. The research did not include the price premium for the sale of products of organic quality. Given the role of organic agriculture, the study was supplemented by selected environmental indices: the crop structure (share of cereals), the share of intercrops, soil organic matter balance, and nitrogen, phosphorous and potassium (NPK) ratio.

The comparison of cereal production in different management systems at the field level showed that, in the planting of spring wheat with undersown clover and grasses in organic and integrated farming, and pure sowing in the conventional high-input system, the highest gross margin value was obtained from the integrated system (PLN 5,675 per ha), followed by organic farming, just PLN 151 lower (PLN 5,524 per ha). However, after subsidies to organic farming were taken into account (additional payments to farmers for cultivated crops after conversion), the highest gross margin was generated by organic farming (PLN 6,714 per ha), which was PLN 1,039 higher than the gross margin obtained in the integrated system.



A Summary

In spring wheat cultivation, the highest profitability ratio (i.e. the value of production to the value of direct costs, expressed as a percentage) was produced in the organic system with a relatively high value of production and the lowest direct costs at the same time (393%). In contrast, the organic system had the lowest gross margin value in the growing of winter wheat (PLN 5,799 per ha). Although taking additional payments to organic farming increased the value of the gross margin to PLN 6,714 per ha, its value was still lower when compared to other production systems. However, the organic system (having the lowest value of production and the lowest direct costs at the same time) showed the highest profitability ratio value (558%).

The comparison of crop rotations in different systems of management showed that crop rotation in the organic system produced lower yields of the cultivated crops than those in the integrated system. It was also characterised by lower crop rotation yield expressed in cereal units (CU), which totalled 61.7 CU/ha. Nonetheless, the lowest average yields were produced by three-field crop rotation in the conventional system (53.0 CU/ha). In terms of labour intensity, crop rotation in the organic system required less labour (13.3 WH/ha) than in the integrated system (15.8 WH/ha). Nonetheless, the lowest demand in that regard was observed in the conventional system (5.9 WH/ha).

The organic system produced the highest profitability ratio values (506%), while the gross margin value excluding the additional payments totalled PLN 8,399 per ha, and grew to PLN 9,503 per ha after the additional payments to farms for cultivated crops after the conversion. Even so, it was lower than its counterpart generated in the integrated system (PLN 12,248 per ha).

The authors emphasise that, among the environmental indicators comprised by the analysis, five-field crop rotation in the organic system had the lowest share of cereals (40%) and the highest share of intercrops. It also revealed the soil organic matter balance at a relatively high level (1.39 t DM/ha ARA), yet still lower than that in the integrated system due to low crop yields (1.71 t DM/ha ARA).

As regards the mineral balance of phosphorus and potassium, crop rotation in the organic system was close to equilibrium, reaching the values of -4 and -3 kg/ha, respectively. In contrast, the value for nitrogen was much lower, at -39 kg N/ha, which could lead to the depletion of this nutrient in the soil in the longer term. In crop rotation in the high-input conventional system with a 67% share of cereals, the mineral balance showed a high surplus of nitrogen, at 136 kg N/ha.

The balance for the remaining minerals was close to equilibrium, with -3 kg P/ha for phosphorus, and 22 kg K/ha for potassium. The high balance surplus in the case of nitrogen can be explained by relatively high fertilisation with this element and low crop yields obtained in the crop rotation in question. The balance of minerals referred to above suggests that all the systems of agricultural production call for measures aimed at improving the effectiveness and optimisation of macroelement management. For this reason, a decision was made in the





Biosafety and Biosecurity in Food Production – from Ethics to Economics

Osiny study to resume crop rotation in the organic system, applied in the period 1994–2018. The previous pattern involved a greater share of small-seed leguminous plants: potatoes, spring wheat + clover and grass undercrops, clover and grass (first year), clover and grass (second year), winter wheat + intercrop.

In conclusion, the authors state that although organic farms produce lower yields than conventional farms, they can sometimes attain similar if not higher profitability and economic efficiency, mostly due to additional payments and low production costs. Such results can be obtained by well-managed organic farms that follow the principles of this particular production system and apply adequate agricultural engineering measures. In comparison with conventional production, the economic efficiency and profitability values of organic farming depend on several factors, such as production profile, farm size, sales markets, soil and climate conditions, and can differ from the results obtained in the model farm in Osiny run by the IUNG-PIB.

No less importantly, organic farms are more effective than conventional farms in the protection of soil, environment and biodiversity, and in the provision of high-quality food. The existing system of additional payments to organic farmers also serves as a tool intended to preserve a clean environment in rural areas, and as such, produces benefits for society as a whole through supporting the so-called public goods and ecosystem services. Despite the difficulties impeding the development of organic farming in Poland, assistance intended for that production system under the new perspective of the Strategic Plan for 2023–2027 opens more opportunities than before for the expansion of organic farms and the market for organic products and initiatives.



The Foundation for the Development of Polish Agriculture (FDPA) is a nongovernmental organisation with traditions dating back 35 years. Our mission is to support the sustainable development of rural areas, in particular, enterprise and the creation of jobs outside agriculture, and to ensure equal opportunities for women, the unemployed, and young people. To this end, as one of the most active and largest loan funds in Poland, we engage in loan activities and services fostering the development of small rural enterprises.

We take part in local development programmes, community initiatives, information, and education schemes. We also publish respected studies and specialist reports such as the biannual report on the state of Poland's rural areas (latest edition: *Polska wieś 2022. Raport o stanie wsi*) and numerous publications to promote the sustainable development of rural areas that deal with issues such as adaptation to climate change and effective resource management.

Since 2009, we have regularly organised a competition entitled Rural Poland – the Legacy and the Future for scientific and popular-science works on agriculture and rural areas and those that promote their history and cultural heritage. We initiated debates held as part of the cyclical event entitled Rural Poland in the 21st Century. We have also organised many international, domestic and local projects addressed to rural residents, farmers, local governments, agricultural advisory centres, public institutions as well as small and medium-sized enterprises.



Foundation for the Development of Polish Agriculture

www.fdpa.org.pl

www.facebook.com/Fundacja.FDPA

The quality and safety of food is currently regarded as an issue of the utmost importance by consumers and state authorities alike. This monograph also offers valuable insights for researchers and students, food producers and members of institutions enforcing food regulations. The publication is notable for its interdisciplinary approach combining the knowledge of the scientific community with the expertise of inspectors from the Agricultural and Food Inspection (IJHARS).

Prof. Robert Kupczyński

The latest discoveries in science alongside technological and IT developments currently taking place, are helping to increase consumer awareness and drive improvements across all branches of production. EU agriculture is a major contributor to global food production and has a responsibility for addressing current and forthcoming challenges. The authors of the monograph deal with the different issues that impact food quality in the European Union.

Prof. Anetta Siwik-Ziomek

The monograph is the fourth of five volumes compiled as part of a project titled *European Green Deal – Opportunities and Challenges for Polish Agriculture*, administered by the Foundation for the Development of Polish Agriculture (FDPA). The papers included here were originally presented at seminars focused on formulating guidelines for the implementation of the EU's new scheme, European Green Deal (EGD), through farming practices aimed at enhancing opportunities for the development of Polish agriculture.

