

# TRUST AND FOOD BIOTECHNOLOGY

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## 29.1 Introduction

Food biotechnology is a broad field in which technologies are developed by making use of biological processes, organisms, cells or cellular components. The technology is used in many contexts and in the production process of many food and feed products. Sometimes the food product itself is modified, like in the case of genetically modified (GM) corn or soy. In other cases, the role of biotechnology is less obvious for the end-user, e.g. when it is used in the brewing process of beer. Despite these differences, in all situations food biotechnology is complex. Individuals cannot fully control or have full knowledge of all human activities related to food biotechnology. Consequently, everyone has to rely on others, both individuals and institutions. As for technology in general, the exact nature of the relation between trust and food biotechnology is not directly clear. Sometimes technology is portrayed as an element that causes or intensifies a lack of trust or even distrust in science or private companies. In other cases, technology is proposed as a way to deal with risks and uncertainties and therefore is considered as a way to reduce the need to trust (cf. Levidow and Marris 2001; Hsiao 2003).

This general picture of the relation between technology and trust is even further complicated in the case of food biotechnology. Food biotechnology combines the discussion on changing basic elements of life and flourishing with an essential element in human life: food consumption. As a consequence, trust in food biotechnology is often framed as a problematic relation (Marques et al. 2015; Lucht 2015; Master and Resnik 2013). While I will adopt this framing of a “trust problem” for my analysis of the role of trust in food biotechnology, I will in the end challenge this framing and suggest a focus on trustworthiness instead of trust. In the following, I first analyze the dual relation between trust and technology. Second, I discuss the question whether it is possible to trust food biotechnology before, third, elaborating on the question how to address low trust or distrust in food biotechnology. Finally, I argue that trustworthiness is an indispensable prerequisite for trust in food biotechnology.

## **29.2 Trust, Food and Biotechnology: A Complex Relation**

Trust and the lack thereof is often discussed explicitly in the context of technology (cf. Drees 2009; Myskja 2008; Master and Resnik 2013). This especially holds for food biotechnology. Since the debate on genetically modified (GM) food at the end of the last century, consumer trust in biotechnology has received a lot of attention. Trust is often considered as a pivotal, but problematic element for any use of biotechnology. Right from the start of the GM-food debate, the reluctance of consumers to buy and consume GM-products was considered to be related to an issue of low consumer trust. Therefore, it has been stated repeatedly that there is a clear need for rebuilding and maintaining public trust. For instance, in 2000 the OECD reported after a meeting on GM-food that “a strong sense emerged that there was a need to take steps to rebuild trust among the various actors, particularly governments, industry, scientists, regulatory agencies and the public” (OECD 2000). Two years later, the FAO stated that “the food safety system ... must be able to both manage risks and create trust” (FAO 2003). More recently, Frewer emphasizes that “[s]ocietal trust ... is an important factor in determining societal acceptance of agrifood technologies” (Frewer 2017:4). Also, Runge et al. (2017) stress the importance of trust when they claim that “[a]wareness of food-related biotechnology, and a decrease in trust that institutions within the food system can keep food safe, work concurrently to prompt the public to reconsider its way of thinking about food” (Runge et al. 2017:590). While a decline or lack of trust is lamented in regards to many institutions and technologies, the intensity of these debates in the context of food biotechnology is and remains remarkably high.

### **29.2.1 Defining Trust**

Following Baier, who compares trust to an atmosphere, explicit attention to trust is an important sign. She argues, “we notice trust as we notice air only when it becomes scarce or polluted” (1994:98). From this perspective, discussing trust in the context of food biotechnology implies that trust apparently has become “scarce or polluted.” However, before jumping to an analysis of whether this metaphor is apt, it is important to start with the question what we mean with the concept of trust. This conceptual clarity is important, because Hardin accurately noticed that, “the notion of trust in the vernacular is often vaguely warm and fuzzy” (1999:429). This vagueness is not restricted to the vernacular. Also at the level of academic analysis there is a “conceptual jungle” (Lindenberg 2000) and a lack of conceptual clarity (Gambetta 1988).

Some philosophers of trust define trust as a form of belief (see also Keren, this volume). However, conceiving trust as a form of belief raises some questions. While such belief-based definitions clearly have some plausibility, they appear unable to account for the so-called leap element of trust, indicating that trusting includes more than a belief that is exclusively based on evidence. Information facilitates trust, but it is impossible to define a sufficient level of evidence to arrive at trust. There is an element in trust that “happens to us,” rather than that we decide to adopt a stance of trust. Secondly, the dynamic relation between trust and evidence remains unanswered if we consider trust as a cognitive belief. Evidence is not the only input in the process of coming to trust. The direction is also the other way around: trust appears to be a precondition to obtain knowledge (see also, Miller and Freiman, this volume).

This illustrates that trust has an ability that beliefs normally do not have: it can color the value we attach to certain beliefs, make them resistant to change or exclude other beliefs

from deliberation. To deal with these features of trust the emotional element of this concept has to be taken seriously (see also Lahno, this volume). Explicating the emotional element shows that emotional judgments steer the perception of the available evidence. This is not to say that trust is only a feeling that appears fully independent of evidence. The emotional component quite often refers to an implicit assessment of the competence or motivation of the trustee rather than to pure irrationality or ignorance.

Based upon these considerations, I propose the following working definition of trust: Trust is an attitude towards individual or collective human agents that enables an agent to cope with situations of uncertainty and lack of control, by formulating a positive expectation towards another agent, based on the assessment of the trustworthiness of the trusted agent (Meijboom 2008).

### ***29.2.2 Biotechnology and the Relevance of Trust***

Trust as an attitude that enables us to cope with situations of uncertainty and lack of control seems especially relevant in late modern society. Many sociologists have shown that the complexity of social life has led to increased levels of risk and uncertainty (Giddens 1990; 1991; Luhmann 1988). This has changed the character and scope of the need to rely on others. Furthermore, scandals and affairs have affected trust in a range of institutions, such as food-related animal diseases, but also the impact of the recent financial crisis in 2008–2010 on the banking system (e.g. Van Esterik-Plasmeijer and Van Raay 2017).

From this perspective, the relation between trust and biotechnology is ambivalent. When we define trust as a way to deal with uncertainty and lack of personal control, biotechnology can be considered both as source of and a remedy for low trust or even distrust. On the one hand, technology can provide tools that enable us to have control over situations. On the other hand, technologies such as modern biotechnology intensify the dependency of individual agents because of the complicated nature of the topics involved in dealing with issues such as food safety, quality and health. These call for abilities that most of us do not have. Consequently, we cannot but rely on others. This dual effect of biotechnology on trust can be recognized with respect to the impact of this technology on (a) risks and uncertainties and (b) predictable patterns on which one can anticipate.

First, the dual effect of technology can be recognized at the level of risk and uncertainties. On the one hand, technologies are often introduced to address uncertainties and risks. With the help of modern biotechnology, it is possible to get a grip on a situation. For instance, in the past one could only hope that a breeding process would result in the preferred outcome, e.g. a plant that is better resistant to a virus. Nowadays, biotechnology makes it possible to select target genes to make the breeding process of plants more specific. Consequently, we are in a less dependent and less vulnerable position when confronted with the outbreak of a plant disease that in the past would have destroyed the harvest. From this perspective, biotechnology provides us with more control and thus can reduce the need to trust on others or to rely on natural processes.

Nevertheless, the use of biotechnology also raises new uncertainties and risks. When we define risks in terms of chance and hazard, technology can affect both levels. Food biotechnology has an impact on the element on chance due to its influence on the structure of the food chain. It contributes to longer and more complex production chains that are interrelated with many other systems, such as transportation and global trade. Due to this complexity, minor effects of a technology can have consequences

with a major impact for the society. For instance, if there was a problem in the production of one batch of genetically modified soy bean that remains unnoticed, it may affect the safety and quality of hundreds of products all over the world.

Furthermore, uncertainties arise along with the introduction of new technologies. This is the case when the probability and the nature of the hazard are not yet well defined. The debate on food biotechnology is an interesting case, because discussions regarding both the probability that something goes wrong and the precise hazard have been ongoing since the first introduction of genetically modified food in Europe in 1996 (cf. Gaskell et al. 2003; OECD 2000). Such discussions show that the use of biotechnology entails risks and uncertainties which are often difficult to assess, especially because of complicating factors like unknown carry-over effects, possible long-term effects, but also because the consequences are mostly invisible without advanced instruments. Therefore, assessing issues like safety, quality and health are tasks that require powers that most of us do not have. Since only few have the expertise and can assess and evaluate these problems, all others cannot but rely on these experts (see also Rolin, this volume).

This shows a shift in focus. The problem is not merely the dimension and acceptability of the risk at stake, but also one of the reliability of the experts. The experts, not the consumer, make an assessment. Consequently, problems not only occur at the level of the risk itself but also with respect to the trust in the experts on whom one has to rely. The debate on the safety of genetically modified food, however, shows striking tensions amongst experts in their assessment of the risks of modern biotechnology for humans, animals and the environment (e.g. Hilbeck et al. 2015; Meyer 2016). Hence, even though more knowledge and information are available, it is difficult for an individual to decide whom to trust. This shows that even if food biotechnology reduces the need to trust others or rely on natural processes, the implementation and use of this technology is only possible if there is some level of trust.

Second, one could question the importance of trust in the case of food biotechnology by referring to the effects of technology on predictable patterns. Regularly, technology results in procedures that make a situation more predictable. For instance, the use of biotechnology can standardize a food production method so that one can anticipate that the quality of the product is similar at any time and any place. As a consequence, a consumer can anticipate these patterns and, for instance, can buy a food product in a country that one has never visited before. This seems to reduce the need to trust. However, the picture is more complicated. The introduction of new technologies also can thwart existing predictability and familiarity in the food sector. When a technology is introduced, there is often no predictability that can serve as a basis for trust. The example of the introduction of food products with a health claim is an interesting case (Meijboom 2007). Although the relation between food and health is not new, lowering one's blood cholesterol with the help of a margarine or using prebiotics in yoghurt for the maintenance of gut microbiota are still new. Both for drugs and for dairy products there are rather clear conventions and traditions that provide a certain predictability explicating what one can expect regarding issues of safety and justice. This predictability helps individuals to make choices about both food and pharmaceutical products even if they do not fully understand or control the production process. However, since a food product with a real health claim can be categorized in both groups, we lack such predictability. Thus, the introduction of this type of dairy product complicates the possibility to rely on existing roles and patterns. Hence, once more trust in experts, companies or governments becomes essential.

### **29.3 Is Trust in Biotechnology Possible?**

If biotechnology results in an increased need to trust, it raises the question of what it implies to speak about trust in this technology. To answer that question, it is important to look at the three dimensions of a trusting relationship: a trustor (A) entrusts something (x) to a trustee (B).

If we focus on public trust or consumer trust, the trustor commonly is a citizen or a consumer. Mostly these persons are capable of trusting, i.e. they have a certain level of freedom and competence to consider and evaluate situations to assess whether trust is applicable.

With regard to the object of trust, the discussion is more complicated. First, in comparison to other technologies, biotechnology is special because it is changing basic elements of life and flourishing. Consequently, biotechnology links to fundamental views on the value of life and human responsibility. Additionally, more than once the discussion starts with biotechnology, but turns out not be about the technology as such, but (also) about what is modified with the help of biotechnology. For instance, food biotechnology resulted in fierce public discussion also due to the fact that food is special. Food is not merely the combination of all the nutritional ingredients one needs to stay alive, but has strong social, cultural, religious and emotional aspects too (e.g. Gofton 1996). This makes the lack of personal control that come with biotechnology even more problematic. Furthermore, debates regarding food biotechnology are related to broader concerns about food, such as the tensions between industrial food production, cultural and historical perspectives on food or views on sustainable farming. Consequently, what is at stake in the trust relation with regard to biotechnology has a multifaceted character and is not about risks only (Sandin and Moula 2015).

The third element of the trusting relationship is the object of trust. In the daily practice of trusting we can speak about trust in biotechnology. However, the question is whether the object of trust is the technology. In my definition of trust this is not possible. Trust presupposes both the ability and the freedom to choose a goal and to choose it among alternatives. If a trustee lacks freedom there is no need to trust and no possibility to act trustworthily. There is no need to trust if we know that external forces coerce an individual to act in one specific way. Then we know or can calculate based on the available information how someone will act if he is compelled to do so. This is why one need not, in fact cannot, trust the operation of a machine or other inanimate objects. A bridge can perform in a way that is counter to what is expected, but it does not choose to adopt this alternative. It does not have the ability to choose at all. As a result, the bridge can neither trust nor be trusted. This equally holds for other types of technologies. Consequently, trust in biotechnology can only refer to trust in human agents involved in biotechnology, but not the technology itself.

However, even if we focus on human agents, it still is not clear whom to trust. Given the complexity of food biotechnology and the practices in which it is applied, there are multiple agents on whom one has to rely. For instance, a consumer is confronted with a wide range of individual and collective human agents, including researchers, food industry, retailers, governmental agencies and non-governmental organizations (NGOs). This is an important characteristic for trust: the wide range of involved parties is not a sign of inefficient ways of organizing the food chain or the research and development. It is a direct result of the complexity of biotechnology and food production in a globalized world. Due to this complexity not only the consumers but also those involved in food biotechnology need to trust other actors. Suppose one

institutional trustee has a clear competence in assessing the safety of biotech products, we still need another that has an expertise in evaluating the health claims of genetically modified products. Even if both competence fields are combined in one organization, it is most likely that this organization cannot be entrusted with the question whether a GM-food product or biotechnology as such fits to my core values. For that question, I may need to rely on an organization that represents my lifestyle, e.g. an animal welfare organization or a church. This picture is further complicated by the fact that biotechnology is a global issue. Biotech companies often are multinationals and also critical NGOs often operate on a global level. This implies that a trustor is not only confronted with a local retailer or a national food safety agency but with a wide variety of local, national and multinational trustees.

The question at the start of this section was whether trust in biotechnology is possible. The short answer is that (a) trust in biotechnology is related to a broad range of objects of trust rather than only focused on the technology as such, and (b) the technology and the practice of application have a high level of complexity that entails that trust in biotechnology cannot be reduced to trust in one party. This has direct implications for the question how to deal with trust and biotechnology in practice.

#### **29.4 How to Deal with Issues of Trust Related to Food Biotechnology?**

In situations of low public trust in technologies, three strategies can be distinguished that aim at increasing trust: empowering people, increasing predictable patterns and improving trustworthiness. While all three strategies are being employed, I conclude from my analyses that especially the third approach is the most promising if confronted with issues of trust in the context of food biotechnology.

The first route to approach problems of trust starts in the vulnerability of the trustor. He or she is confronted with a lack of control and an asymmetry in knowledge and power. Consequently, empowering people in a way that makes them less vulnerable or provides them with more control seems a promising start to address problem with biotechnology. This approach often focuses on two aspects: risks and information. The risk and safety aspects of biotechnology have dominated the public debate (Gaskell et al. 2004; Eiser et al. 2002), and since trust is relevant in situations of uncertainty, enabling consumers to deal with risks is regularly seen as an effective answer to questions of trust. The idea is that if individuals are able to assess a danger as a risk, they have the opportunity to decide how to deal with the situation rather than the restricted choice to take or leave the danger (cf. Luhmann, 1988). This approach seems promising. If the danger that the use of gene editing in cow breeding may have adverse effects on animal welfare or food safety can be translated into a matter of risk, it becomes an object of action, because a risk can be assessed, analyzed and managed. Therefore, providing information on risks and the enhancement of transparency is often proposed as the most efficient (regulatory) approach to low trust related to biotechnology (cf. Barbero et al. 2017; White House 2017). Despite the importance of both transparency and risk communication the approach has two genuine limitations.

First, the relationship between information, communication and trust is highly complex and remains unclear (cf. Rose et al. 2019). If one does not share any information, it is hard to trust another. At the same time, we lack criteria to determine the minimum level of information that is sufficient to start trusting. Furthermore, communication already presumes some levels of trust. Only if one already considers the provider of information reliable, the information becomes useful. For instance,

someone who trusts a biotech company will probably perceive an open communication strategy on possible risks as a confirmation of his trust. Someone who lacks such trust may well have the idea that this communication on potential risks is another proof that biotechnology should be banned. The same situation with the same level of available information is perceived completely differently.

Second, empowering people to take risk is something fundamentally different from building trust relationships. In trusting you always run a risk: your trust can be harmed. Accordingly, trust is referred to as a risky matter (Gambetta 1988: 235) and as a venture (Luhmann 2000: 31). Nonetheless, trust is fundamentally different from taking risks, even though they can be relevant in the same situation. Trust is not the outcome of an assessment of the risks and benefits of trusting in the light of the aims and goals one pursues. In contrast to someone who takes a risk, a trustor is not calculating risks, but coping with complexity and the uncertainty he is faced with. Therefore, better risk assessment and more risk information do not necessarily lead to more trust. Trust has a different focus. It starts where a risk focus ends. It arises in situations that remain uncertain despite the attempts to turn the uncertain aspects into risk factors. Therefore, a risk-focused approach mainly helps to reduce the need to trust, because it enables a person to assess and control the situation oneself. However, given the complexity of the discussions about food biotechnology, not all problems can be reduced to risks. There remain situations in which we are confronted with uncertainty because “the system behaviour is basically well known,” but not the probability distributions (Wynne 1992:114). In these situations one has to rely on others and trust can play a central role.

A more fruitful response to low trust focuses on the relevance of predictable patterns. Trust needs certain levels of predictability regarding its subject or object. This is what is meant by “anticipatory trust” (Sztompka 1999) or “predictive trust” (Hollis 1998). This type of trust is based upon the expectation that the other party will act according to normal patterns and routines. If clear patterns and routines are available, it is often easier to predict how the person who is being trusted will react and what one can expect. For instance, if you have bought a product for many years, you will expect that its safety and quality remain unchanged the next time you buy the product. Hence you rely on this being so even though there is always a risk that this may be the first time the product is unsafe. Unfortunately, biotechnology lacks such clear patterns and thus routine-based trust appears problematic. Since biotechnology is a relatively new technology and has a broad range of applications, we still lack a normal pattern, a history upon which we can rely and in which the trustee can show his reliability. In regulatory frameworks this lack has been recognized and translated into a strong focus on providing information on underlying standard procedures and routines, either regarding the products themselves or the actors involved. However, information on the level of predictability provides some control in cases of uncertainty but does not necessarily tell us whether and why the other person would act along the normal pattern in a specific case. Since we have the freedom to act, we have the freedom to leave normal patterns and act against predictability. This means we are confronted with new uncertainties: even if there are predictable patterns regarding biotechnology in food, one is still uncertain whether the other party will act according to expectations. Recent food scandals all over the world show that in most cases the problem was not the lack of procedures or regulations, but individuals or organizations who deliberately acted against what has been agreed on (e.g. Fuseini et al. 2017; Mol 2014). These problems suggest that we need additional procedures and regulation that serve as a foundation

for our trust which could result in an endless regression, because we can only rely on patterns if we have sound indications that the other party is reliable.

Responses to low trust in food biotechnology focusing on empowerment and predictable patterns have severe limitations due to the complexity of food biotechnology and the resulting uncertainty and lack of control. As a consequence, a focus on risk, information and transparency will only be fruitful if the “problem of trust” is rather addressed as a “problems of trustworthiness.”

### **29.5 The Importance of Trustworthiness**

My working definition of trust entails an assessment of someone’s competence and motivation, otherwise we talk about other mechanisms to cope with lack of control or uncertainty, such as hope or coercion. The central role of making an assessment of the trustee is a clear indication that most issues of trust about food biotechnology are not so much about trust but about trustworthiness. More specific, if a lack of trust is approached as a failure of the trustor, the issue is defined wrongly and remains intangible for three reasons.

First, there is an argument from strategy: trust as an attitude is difficult to change. As we have seen at the start of this chapter a trustor cannot decide to trust. Trust results in beliefs and expectations but is not a belief itself. One can want to trust, but one cannot trust at will (see also Hinchman, this volume). For the same reason, you cannot make others trust you. Therefore (policy) measures that aim to improve trust in food biotechnology should start from another perspective. The question should not be “How to increase trust?,” but rather “Why would an individual agent trust the other agent?” and “Is this agent actually worth being trusted?” Thus, we need to move from a “problem of trust” to a “problem of trustworthiness.” Biotech companies or governments cannot change individuals in a way that they adopt a trustful attitude. Nevertheless, they can show themselves to be trustworthy. Accordingly, for pragmatic and strategic reasons, enhancing trustworthiness seems a more promising starting point in the process of regaining public trust.

The second argument starts in the trustee’s assessment of the lack of trust as problematic. For instance, if a governmental agency considers a lack of trust as problematic, this implies an implicit claim about their own trustworthiness. Unless, a trustee hopes that someone trusts him blindly, he believes that trust is based on an assessment of his competence and motivation. Thus, if he considers the lack of trust problematic, he implicitly argues that, according to him, the trustor has very good reasons to trust him, i.e. that he is trustworthy. From this perspective, it would be too easy to define a lack of trust as a problem of the individual trustor only. The trustee has a problem too. Even if he is competent and adequately motivated to do what is entrusted, he obviously failed to signal this sufficiently to the trustor.

Finally, the importance of the shift from trust to trustworthiness does not merely have a practical or strategic background. There is also a strong moral reason: the autonomy of the consumer. We have already mentioned that a trusting relationship is by definition asymmetric and marked by differences in knowledge and power. This vulnerable status of the trustor is constitutive for trust. Without this vulnerable position, there would be no need to trust. Nonetheless, this is no permit for the trustee to make use of this vulnerability. Despite the vulnerable status, the trustor should be treated as a person who is capable of autonomous agency, i.e. as a person who has the capacity to choose one’s goals and values personally. This makes the trustor and the trustee equals on a moral



level. Despite the vulnerable and depending position of the trustor and his imperfect knowledge about – in our case biotechnology and food – he still is an autonomous agent. This makes him worthy of respect and has direct implications for the trustworthiness of the trustee. If one takes this moral attitude of respect as a start, a lack of or hesitance to trust cannot longer be defined as failure of the trustor only. Such a view disregards the autonomy of the trustor in two ways. First, it does not take the assessment of an autonomous agent seriously. From the moral attitude of respect, a lack of or hesitance to trust should be acknowledged as a legitimate point of view, rather than as failure only. This does not imply that the trustor cannot be wrong but shows that the burden of the proof also lies on the side of the trustee. The vulnerability of an autonomous agent comes with a moral reason for the trustee to take additional care in being trustworthy and signaling this appropriately. Consequently, the main question is not how the individual can be changed so that he will trust, but what conditions the trustee has to fulfill to be worthy of such trust.

### **29.6 Challenges for Trustworthy Food Biotechnology**

With trustworthiness as the answer to the question of how to deal with issues of trust related to food biotechnology, we are confronted with the question of what trustworthiness implies in the context of biotechnology. At face value the answer seems easy: to be trustworthy one must be competent in the relevant matter and has the motivation to respond adequately to what one is entrusted. In practice, however, acting in a trustworthy way in the context of biotechnology is not that easy. This has its origin in (a) the broad scope of what is entrusted in the context of biotechnology, (b) the complexity of food biotechnology and the impact on the number of trustees and (c) the lack of consensus on societal values related to biotechnology.

As mentioned before, food biotechnology is related to an impressive list of issues that can be entrusted, such as food safety, cultural and historical traditions of food production, animal welfare, biodiversity, justice, freedom of choice, and privacy. Therefore, clarity regarding both one's competence and motivation as well as the limits of both are essential. For instance, when an international biotech company only communicates about its competence in scientific progress although it has equally strong competence and motivation regarding responsible research and innovation, it should not come as a surprise that trustors will perceive the company only competent in a technical way and will not entrust it with questions of societal implementation. Suppose conversely, the explicit commitment of a local governmental body to improve animal welfare results in the expectation of a trustor that this government will only license biotech applications that improve animal welfare in food production. Even if this organization is genuinely committed to improving animal welfare standards, to be entrusted with this idea of regulating food biotechnology is problematic. Due to international trade regulations it is very unlikely that a local governmental body is capable to allow animal friendly biotech applications only (cf. Meijboom and Brom 2003; De Simone and Serratos 2005). Therefore, to be trustworthy, a trustee has to be clear on its commitments, but also on the limits of what can be entrusted.

A second hurdle in dealing with trustworthiness is related to the complexity of food biotechnology and the related distribution of responsibilities. Food biotechnology covers a wide range of products, tasks and actors. Consequently, a division of labor and responsibilities is already in place to guide and regulate this technology. For instance, product development is the responsibility of companies, whereas licensing and

regulation is the task of governments. However, such as division of responsibility and related ideas of what one can reasonably expect of this organization is not always that well defined. Small startups in biotechnology next to multinational companies, lobby organizations for biotechnology next to critical NGOs and local governmental bodies next to global trade agreements all play a central role in food biotechnology. Because of this broad spectrum of relevant actors, it is not directly clear who is trustworthy and should be trusted, when I – as a citizen and consumer – am concerned about the effects of food biotechnology on the position of farmers in developing countries. This shows that biotechnology raises questions of trust without a well-defined set of trustees nor consensus on what one can reasonable expect from whom. This issues touches on a more fundamental debate on how a global society should be arranged in way that do justice to the complexity at stake. It is unlikely that one super-national organization, either governmental, non-governmental or commercial can deal with all trust issues. As a consequence, cooperation among the trustees is essential as well as clarity in the communication amongst the trustors on the content and limits of a trustee's competence and motivation.

Finally, biotechnology confronts us with the fact that many societies harbor a striking plurality of moral views. We lack consensus on the importance and relative weight of moral notions such as animal welfare, the value of nature, biodiversity or duties towards future generations. Although we have tools and ways to address this plurality, e.g. by improving communication, increasing transparency or enhancing the level of reflection, the problem or moral pluralism remains.

Trust and trustworthiness can be complicated by this moral pluralism because of conflicting moral views, but also because of doubts about whether a trustee is competent and motivated to deal with individual concerns. For both challenges there is no easy solution and they show that trustworthiness in the context of food biotechnology requires a competence to deal with ethical concerns and conflicts. This implies that trustees can benefit from awareness of their own normative presuppositions and from identifying potential ethical issues early on.

Moreover, trustees need to reflect upon the fundamental context-specific commitments and concepts relevant for trust. In the context of food biotechnology, for instance, freedom of choice appears to be crucial. Being trustworthy therefore requires reflecting upon this freedom and guaranteeing consumer choice as a translation of this basic commitment. Finally, a trustee can deal with the challenges of the plurality of moral views by participating in or initiating public debates. These debates help to explore the nature of moral concerns and clarify the mutual expectations between trustor and trustee.

## **29.7 Conclusion**

From the perspective of trust, food biotechnology is a special case. It has two sources from which trust questions can occur: the technology and food. As a technology biotechnology is special because it is changing basic elements of life and flourishing, because of its many fields of application and the related range of potential impact, and because the results are mostly invisible for the end-user. As a result, biotechnology leads to situations of uncertainty and lack of control, i.e. to situations in which trust is essential. The application of biotechnology to food makes it even more distinctive, since food is linked to personal values and people's identity. Therefore, what needs to be entrusted to others is special and important to trustors.

Neglecting this special and multifaceted character of food biotechnology, we run the risk of paying simultaneously too much and too little attention to trust and biotechnology. On the one hand, it may result in paying too much attention to, and even overload biotechnology with all kind of trust problems that are not specific to this technology, e.g. debates on the freedom of farmers, food security or animal welfare. On the other hand, we run the risk of paying not enough attention to the special character of food biotechnology if we strip the debate to the technology part only. In that case issues of trust can easily, but mistakenly be restricted to a matter of risk and safety only.

The special character of food biotechnology also becomes explicit in dealing with the question how to deal with the lack of or hesitance to trust. Next to strategies to empower consumers/ citizens that reduce the need to trust in the context of biotechnology, approaches that start in trustworthiness are most promising. This holds for individuals as well as institutions. In the context of food biotechnology, showing oneself worthy of trust implies awareness of and clear communication about one's competence and motivation. Given the wide range of goods being entrusted and the complexity of issues at stake, four steps are essential for trustworthiness.

First, acknowledging individual or intuitional limits and clear communication about trust expectations that one cannot fulfill. Second, it is important that trustees in the field of biotechnology bring their own ideas about mutual responsibility more closely into line with each other. Since no trustee can be trustworthy in regards to all relevant issues related to food biotechnology it must be clarified who is responsible for what. For instance, food safety may be primarily entrusted to the government. However, both for the trustors and for the government it is essential to be aware whether the relevant private companies also recognize this as a shared responsibility. If this were not the case, the government may not be even competent enough to act trustworthy or at least has to rearrange its organization, e.g. by installing a stronger food safety authority. This shows the relevance of third step. Trustworthiness in food biotechnology asks for systematic attention to a renewed institutional infrastructure that can deal with questions of trust related to a technology that is researched and developed in a global setting and traded on a global market, but at the same time implemented in specific and local contexts and used by individuals. This asks for both cooperation among trustees and innovation in institutional structures. Finally, the combination of food and biotechnology shows that trustworthiness requires attention to the ethical and socio-cultural dimensions. The debates in food biotechnology on issues such as farmers' autonomy, just distribution of benefits and animal welfare show that these topics are not just an addendum to the debate on risk and uncertainty. They are a core element of food biotechnology and need to be addressed if one aims to be worthy of trust

This proposal to focus on trustworthiness in food biotechnology will not solve all problems related to trust but is an essential step to address the relation between trust and food biotechnology.

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