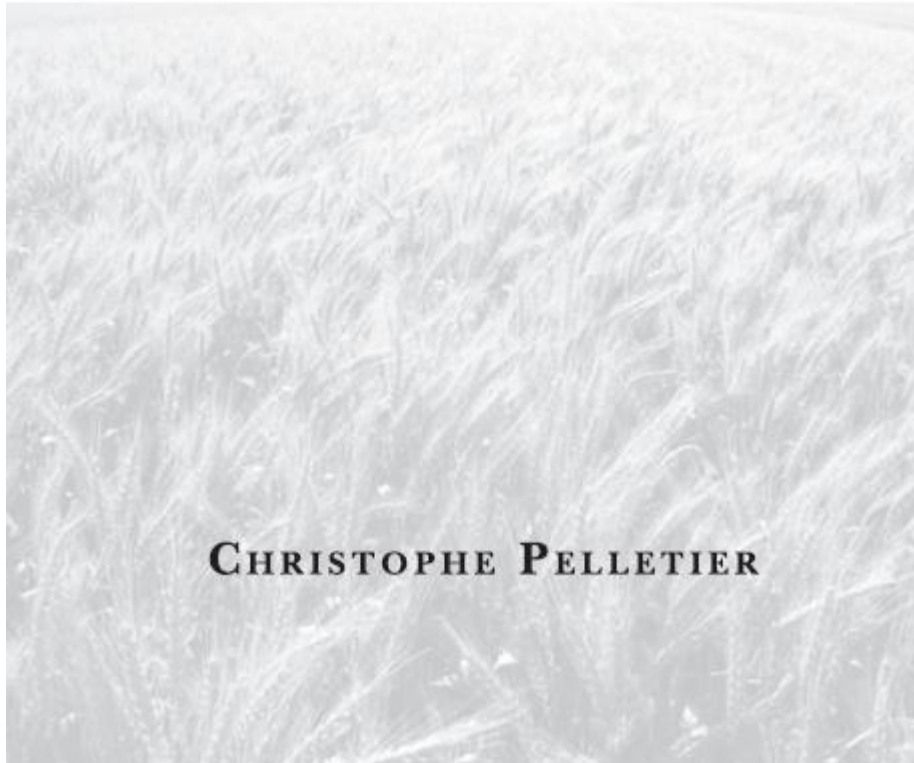


FUTURE HARVESTS

THE NEXT
AGRICULTURAL
REVOLUTION



CHRISTOPHE PELLETIER

“An empty stomach is not a good political advisor.”
ALBERT EINSTEIN

TO ALL

the men and women

committed

to take on

the challenge.

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Preface

Food is not only one of the most enjoyable things in life, when prepared well. It is essential to our survival.

By developing agriculture some 10,000 years ago, our ancestors created an important milestone. They moved away from hunting and gathering, and took the first steps towards more food security. Agriculture has evolved dramatically since then. Farmers have been able to domesticate more and more plants and animals to provide for their needs and the needs of their communities. They invented new tools, developed new techniques and learned how to improve and increase production. This has not always been easy and the history of humanity is paved with periods of famines.

It has been a continuing challenge to grow enough food to meet the needs of the growing population. In the 19th century, Malthus was already expressing his concerns about the growth of the population and he foresaw risks of not being able to produce enough. Malthus's theory made sense in the context of his time. However, he did not foresee the huge changes that took place with and after the industrial revolution. Science has made tremendous progress, which has led to an impressive development of all sorts of technologies.

Today, there are similar concerns because of the expected population increase of three billion people between 2000 and 2050. Some claim that feeding such a population would require the equivalent area of three or four Earths. This may be a nice wish, but the fact is

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that there is only one. The FAO (Food and Agriculture Organization of the United Nations) estimates that current agricultural production needs to increase by 70% by 2050 to meet the demand of the world population. Regardless of which number one chooses, action is needed and another agricultural revolution is required in order to succeed.

Oil has been a key element in the transformation of agriculture during the 20th century. It has allowed the development of powerful machines. Oil revolutionized mobility and transport. In this period of cheap energy and highly efficient new production tools, agricultural production soared to levels never imagined before.

Because of oil, a new society centered on mass consumption appeared. Cheap oil, or at least perceived as such, allowed the development of fast delivery of goods from all over the world. Cars became the vehicle of choice for shoppers. Drive-through fast food outlets and large supermarkets, with parking lots, became the model for distribution and consumption.

This model is now seriously challenged because of the consequences of its excesses. The cost of the impact on the environment has never been factored in the cost price of the goods we consume. We over-consumed and wasted our resources. The consumption society has contributed to an increase of the level of contaminants in the air that we breathe, in the water that we drink and in the food that we eat. It has created mountains of non-biodegradable garbage, and it has depleted essential resources to almost the point of no return.

In agriculture and food, it is now necessary to envision how to produce food when oil will not be as cheap and available as it used to be. The oil era helped increase production, with its set of positive effects and its set of negative effects. The world population is facing major challenges. In order to overcome them, the rich countries must undergo changes that go beyond what most of them are currently willing to give up. The reserves are shrinking and oil will inevitably become too expensive to buy and to produce. The carbon emissions, direct and indirect, that

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oil produces need to be reduced if we want to have a chance of maintaining an environment in which the human species can survive. Oil will follow the same path as coal during the 1980s. Another energy source will replace it and we already have all the technologies and the resources to make this happen. So far, the main resistance is the price of the alternatives, but this will change.

Humanity has also demonstrated an amazing ability to adapt and innovate in order to overcome problems that often seemed impossible to solve at first. Food production will have to be more efficient than ever. Despite all the progress made in agriculture, our farmers still have one major weakness: their very limited ability to control the climate or to avoid natural disasters. They have been good at selecting plant varieties and breeding the best farm animals they needed to produce efficiently, but they are still as vulnerable and helpless as they were in the early age of farming when it comes to dealing with drought or excessive precipitation, or to facing an infestation of pests.

The purpose of this book is to present the many areas of food and agriculture that need to be addressed and the problems that need to be solved to feed a growing population. Challenges are always a source of opportunities. There is no doubt that the future of food will see much innovation and new technologies, new production techniques, new products, new distribution strategies, new transportation systems, new packaging ideas and preservation techniques. In the following pages, I have gathered the topics that will influence our decisions and the solutions that will be available to feed more people. Some solutions are about science and technology. Some of them are highly controversial and the debate is sometimes very passionate and emotional. Our future depends on our choices. Human nature can deliver the best as it can deliver the worst. Politics and finance sometimes bring their share of controversy. A number of companies appear in the book. I chose to name them because they offer interesting or innovative solutions. Some may succeed, some may not, but people who try to make the world a better place need to be praised. Humans have thrived because they created tools and developed the ability to think and create new ideas. Our future success

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depends very much on our resourcefulness and our ability to use our minds for the best.

I wish you happy reading and I hope this book will motivate you to become an active part of the transformation of our food production and food supply.

Christophe Pelletier