

Biodiversity: Land

Grains & seeds

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Key learning objectives

Aim: to introduce the concept of biodiversity when sourcing grains and seeds.

Learning objectives:

1. Understand the need for greater crop diversity.
1. Identify the different types of grains and flours.
1. Introduce strategies and techniques to modify recipes considering gluten content.
1. Evaluate the physical characteristics of the modified recipes before and after cooking.



Practical task

Concept: Cooking with a wider range of ingredients

Dish: Pizza

Quick description:

- Activity 1: Experiment with making pizza dough with different ancient grain substitutes
- Activity 2: Product evaluation



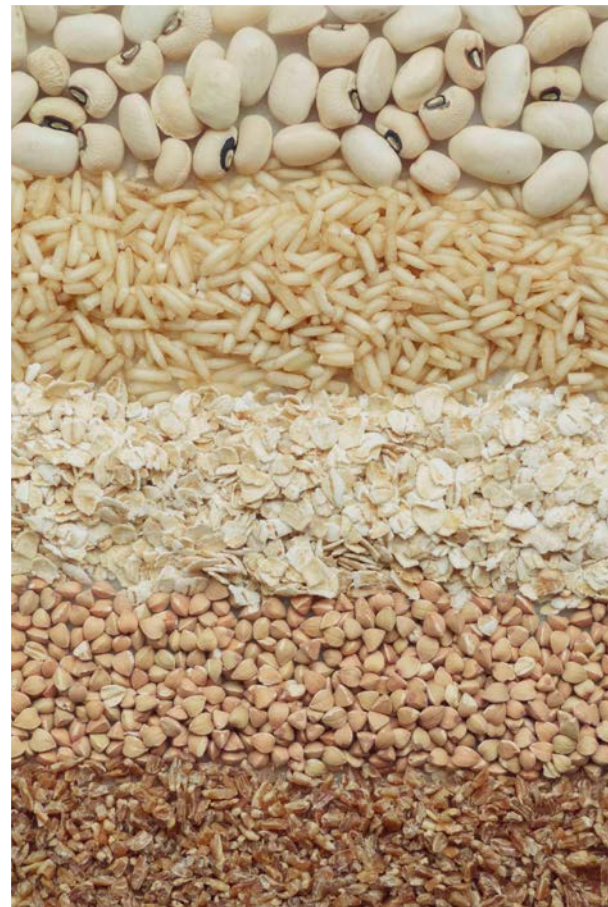
Key things you need to know...



Diversity of food crops

We rely on a small number of species for our food

- The Food and Agricultural Organization (FAO) estimates that of the 6,000 plants grown for food, **just 9 plants account for 66% of global output**, from a possible 250,000 known edible plant species.
- More than half of the world's food energy comes from a limited number of varieties of **three “mega-crops”: rice, wheat, and maize**.
- Our livestock production is based on around **40 animal species** with just a handful providing the majority of meat, milk and eggs.
- Since 1900 we have **lost 75% of the genetic diversity** in agriculture, for example in Thailand there are now just 37 cultivated varieties of rice, down from an estimated 16,000.



Source: (FAO, 2018) <http://www.fao.org/news/story/en/item/1180463/icode/>; <http://www.fao.org/3/x0171e/x0171e03.htm>

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Image: FOODISM360 on Unsplash



Diversity of food crops

Lack of diversity risks future food security and valuable sources of nutrition

- This **loss of diversity brings serious risks** from:
 - Crop diseases
 - Reduced ability to adapt to the impacts of climate change
 - Negative environmental impacts that can result from monocultures (a system where only 1 crop is grown) – such as degrading soil health or the need for chemicals to control against the build up of pests
- As well as risks to future food security, we also **miss out on many valuable sources of nutrition.**

“Diversified diets not only improve human health but benefit the environment through diversified production systems that encourage wildlife and more sustainable use of resources.”

Peter Gregory, Research Advisor,
Crops For the Future



Loss of biodiversity

At the same time we have lost 60% of our wildlife populations in just over 40 years

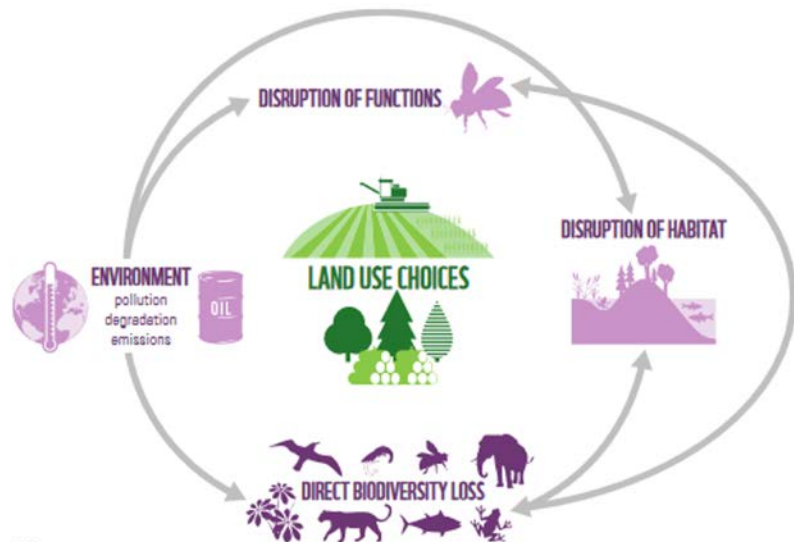


Figure 5:
Direct and indirect
negative impacts of land
use choices on biodiversity

- Agriculture covers **two-fifths of the land** on Earth
- **How we produce food** - for example the use of pesticides and fertilisers - has an important bearing on global biodiversity.
- **Expansion of agriculture** into natural ecosystems, such as forests, can have a devastating impact on biodiversity, as well as greenhouse gas emissions.

Tips for chefs...



Incorporate a diverse set of ingredients into your dishes

WWF and Knorr have identified 50 (often forgotten) foods we should eat more of



Examples include: wakame seaweed, black turtle beans, mung beans, prickly pear, spelt, okra, moringa, maitake mushrooms, hemp seeds and purple yam

"The search for nutrient-dense plants has taken us toward ancient grains, heirloom plant varieties, and less commonly cultivated crops. There is a good reason for rediscovering some of the forgotten plants."

Dr. Adam Drewnowski,
Director of The Center for
Public Health Nutrition,
University of Washington

The [Future 50 Foods](#) have been selected for their high nutritional value, relative environmental impact, flavour, accessibility, acceptability and affordability.



Example: *Experiment with different kinds of flours*

- Use grains, but also dehydrated vegetables, beans, pulses, nuts and seeds can work as a flour (and find out [how to soak them](#) properly!)
- Work with different techniques to harness the potential of different flours – also try mixing and combining
- Grinding whole grains in a nutribullet / vitamix can create fresh tasting flours and different flavor profiles
- Dry roasting and toasting before use can create nutty flavours
- Soaking, sprouting and cooking can change the texture (these can be added to doughs)
- Fermenting can create a new flavor profile i.e. sourdough
- Use the natural flavour profile of the alternative flour to make new and interesting dough's and breads



Source ingredients that support sustainable farming practices

These are some UK standards to look out for...



Organic

These standards require farmers to limit the use of pesticides and artificial chemical fertilisers. This encourages farmers to focus on developing a healthy, fertile soil. There are a number of different organic certifications.

Labelling is no substitute for getting to know a supplier and working with them to understand the sustainability work they are doing on-farm



LEAF

Linking Environment and Farming

Farmers use this scheme to audit their production systems, from soil management to pollution control.

The **Red Tractor label** gives you assurance that the food complies with UK laws on environment, food safety and animal welfare. In some instances this includes other steps beyond the legal minimum.



Source ingredients that support sustainable farming practices

Some other labels to look out for...

There are lots of standards globally but common ones include:



Each of these has different requirements and covers different sets of agricultural products. The standards require that the product can be traced back to the farm and that the farm follows certain practices (including some social, as well as environmental requirements), often incorporating requirements to try and prevent expansion of farming into forested areas.



Summary: key takeaways

Key things you need to know:

- We currently rely on a very narrow range of species and varieties for our food
- If we don't diversify the food we eat, we risk crop diseases and environmental degradation, as well as missing out on many valuable sources of nutrition
- At the same time, we have seen a huge reduction in other forms of biodiversity.
- How and where we produce food has a huge impact on biodiversity and natural ecosystems

Tips for chefs:

- Incorporate a diverse set of ingredients into your dishes, including 'forgotten' foods
- For example, try making flours from dehydrated vegetables, beans, pulses, nuts and seeds
- Source ingredients that support sustainable farming practices by working with your suppliers and buying certified products

