

The Global Garden

*This year's seed offering from Crofting Connections is small, but has wider potential to bring the learning into the classroom, providing a context for key aspects of **Learning for Sustainability – Outdoor Learning and Global Citizenship**.*

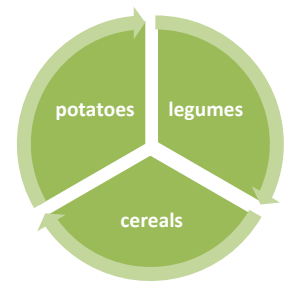
*The school growing space gives us **easily accessible, frequent and progressive opportunities for pupils** to explore the natural world and our interaction with it, as we take care of the soil in order to plant, grow and harvest food.*

*In a busy school day, it can sometimes be hard to be flexible enough to work with the weather and the growing season, but gardening is a great starting point for **Outdoor Learning, Global Citizenship and Health and Wellbeing**, which gives us **links to other aspects of the curriculum**.*

To celebrate **the United Nations Year of Pulses 2016**, we are sending you:

- three packs of **legumes** – Borlotto beans (eaten dried as **pulses**) and two varieties of peas for eating as fresh whole pods;
- three packs of heritage **potatoes** – see varieties on separate worksheet;
- one pack of **cereals** – bere, the landrace barley still grown in Orkney.

These seeds represent three major edible plant families – **legumes** (including **pulses**), **potatoes** and **cereals**. They contribute to balance in the soil, balance in the crop rotation and balance in the diet. In turn they help to restore a balance in the global food supply. **Balance is a key to sustainability.**



Legumes are plants whose fruit is enclosed in a pod.

Pulses are a subgroup of the **legume family**, but this refers only to the dried seeds we eat.

It includes many varieties of dried peas (including marrowfat peas in Britain), chickpeas, beans, lentils, peanuts, soya beans and lupins (used for animal feed). You can find some of these in the shops.

Surprising facts about pulses you might not know - see

<http://www.fao.org/resources/infographics/infographics-details/en/c/382088/>

Instructions for growing the legumes – peas and beans

Sugar snap and **mange-tout peas** are both eaten as whole young pods, the sugar-snap is harvested when slightly plump and the mange-tout is flat. **Borlotto Lingua di Fuoco bean** is a dual purpose climbing French bean, for use as fresh whole young pods or to store as dried beans (**pulses**).

Sow in April or May, under glass or in a polytunnel outside, to get a harvest in the summer term, or leave the peas till early August to get a crop in October.

Plant out 5 cm apart for peas, 30 cm apart for beans, in rows 60 cm apart, in a polytunnel or sheltered place outside. Train sugar snap peas and Borlotto beans up 1.5m sticks. Use netting for mange-tout peas.

Harvest peas and beans when the pods are crisp and young, to eat as whole pods, raw or lightly cooked.

For dried beans to eat as home-grown pulses, leave the pods on the plants till they are dry. You can cut down the whole plant and hang upside down to dry in a polytunnel or airy shed. Thresh the whole plant in a sack, or shell each pod. **Store the dried beans in a sealed container.**

To save peas and beans for seed next year, leave some pods to mature and keep dried seed in a cool place. After the harvest, cut the stems at the base of the plant, leaving the roots in the ground to carry on releasing nitrogen into the soil for the next crop.

Instructions for growing bere as a seed multiplication project.

This small amount of seed will only give you enough ripe grain to multiply as seed for a larger crop next year. Sow seed in late April/early May in a weed-free seedbed. Sow the seed 5 cm apart, in rows 20cm apart. As grain ripens in late summer, protect to keep off birds. Harvest the whole plant when grain is milky-ripe and hang stalks upside down in an airy shed to dry thoroughly to keep for next spring.

The balanced soil:

2015 was the **UN International year of Soils**.

The first step in the garden is to prepare the soil to make a good seedbed for planting seeds, tatties or seedlings. The soil needs to be fertile and weed-free to give the young plants a good start.

For information on soils resources, see page 5.

Plant emergence: from seed to seedling

After you have sown the seeds, make a note of how many days they take to emerge as seedlings.

Seeds have different structural types, depending on how many **seed leaves (cotyledons)** they have:

- **Cereals** are called **monocotyledons** because they have one cotyledon or seed leaf
- **Peas and beans** are called **dicotyledons** because they have two cotyledons or seed leaves
- **Potatoes** are grown from **tubers**. The leaves emerge from the “eyes” in the tuber.



Which is which?

Can you see the two seed leaves and the falling seed case on the Borlotto beans?

Potato **tubers** are sometimes called **seed potatoes**, though they are not actually seeds.

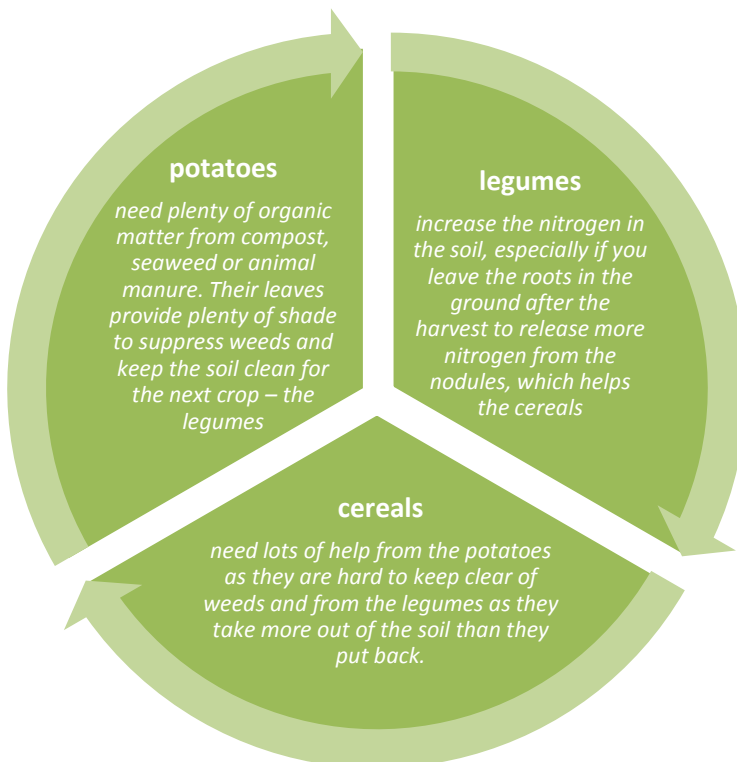
The balanced garden:

Looking after the soil with crop rotations and inter-planting

Biodiversity: In Nature, many species of wild plants usually grow together. Some feed the soil, benefit other plants and encourage other forms of wildlife – from insects and other ‘mini-beasts’ to birds and mammals. Good crofting imitates Nature. Crofters encourage soil health and biodiversity by making compost, spreading manure, seaweed and sand, and using crop rotations. The flowers of legumes encourage bumblebees, honey bees and other pollinating insects.

What is a crop rotation?

Crop rotations help to maintain fertility in the soil. **Potatoes > legumes > cereals** is a rotation that provides the staple foods for diets in many parts of the world.



How does it work?

We have chosen seeds that work well in Scotland:

- **potatoes** - heritage varieties that have been grown in crofting areas for centuries;



- **legumes** – European varieties of **peas and beans**, which can be grown in sheltered sunny parts of the garden or in polytunnels;



- **cereals** - bere the landrace barley once common in the Highlands and Islands and still grown in Orkney.



Can you name other rotations which are used to maintain fertility?

What is inter-planting?

Inter-planting is a method of growing more than one crop in the same space. It works with a combination of tall plants, climbing plants and low plants, including legumes (peas and beans). Benefits include:

- *an overall increase of yields* – you get several crops from the same area of ground;
- *an increase of nitrogen in the soil* from the legumes;
- *adequate light for all plants*, because they grow at varying heights;
- *suppression of weed growth* – because the low-growing plants cover the soil;
- *an increase in biodiversity* – the legume flowers attract bees and other pollinating insects.

Try growing sweetcorn with climbing French beans growing up the stems (the Borlotto bean is perfect for this) and pumpkins creeping along the ground.

The sweetcorn needs to take nutrients from the soil; the beans will fix nitrogen in the soil; and the pumpkins will keep the soil covered. This is a traditional Native American combination, also used in Mediterranean countries, so it will need to be grown in a polytunnel.

You will find another example of inter-planting from Kenya on page 4.

The balanced diet: from harvest to plate



Extending the season:

We can extend our enjoyment of harvest at both ends of the season by eating salads and vegetables from very young to mature. Peas and beans can be eaten as fresh green shoots from the tips of the branches and also very young whole pods—with some varieties grown especially for this, such as **mange-tout peas** and **sugar snap peas**. Peas and beans for podding can be eaten very young and fresh or dried and kept to maintain food supplies between harvests.

Cereals and legumes form a complete protein when eaten together.

These are some examples from around the world:

- Scotch broth, with pearl barley and dried marrowfat peas from Scotland
- Baked beans on toast – a British favourite
- Baked beans and cornbread from North America
- Hummus and pitta breads from the Middle East
- Lentils and rice from India
- Chilli bean and rice from Mexico
- *Githeri* (maize and beans) from Kenya - see page 4

Can you think of others or make your own combinations?



Bean and pasta salad:

- Cooked pasta
- steamed bean pods and sugar-snap peas
- podded peas and podded beans
- cherry tomatoes and fresh sweetcorn
- marigold petals and parsley to garnish.

The peas and beans combine with the pasta and sweetcorn to give you a complete protein.

The Balanced World: The UN Sustainable Development Goals (SDGs) – or Global Goals

<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

The garden is a window into in our increasingly interconnected world. It provides a good context for the delivery of **Learning for Sustainability**. **The International Year of Pulses** is linked to the second **UN SDG**.

SDG 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

The SDGs aim to end all forms of hunger and malnutrition by 2030, making sure all people – especially children and the more vulnerable – have access to sufficient and nutritious food all year round. This involves promoting sustainable agricultural practices: improving the livelihoods and capacities of small scale farmers, allowing equal access to land, technology and markets. It also requires international investment in infrastructure and technology to improve agricultural productivity.

Pulses have been cultivated for thousands of years all over the world. They are an accessible source of protein in a balanced diet. Malnutrition has two opposite causes, both linked to poverty and lack of access to good nutrition – **hunger**, when there is too little food, and **overeating** of processed food, which is high in calories, low in nutrition. In order to produce enough good food for everyone, we need to cut down on meat consumption. Pulses and cereals contribute to a good diet. In Scotland, the traditional diet included peasemeal – flour made from dried yellow peas - that goes back to Roman times in Britain – see page 5 for web link to Golspie Mill.

For other resources which show how the recent UN International years are interconnected, see page 5.

Global Citizenship: *What we learned from Kenya*

A group of teachers from five Crofting Connections schools went to Kenya in the autumn of 2015, as part of an exchange with five schools from Kenya, comparing school gardens and local food production on the crofts of the Highlands and Islands of Scotland with that of the shambas of the Eastern Rift Valley in Kenya. The Kenyan teachers had visited us in June – for more details see Crofting Connections - <http://www.croftingconnections.com/newsitem/291> and NECOFA Kenya <http://www.necofakenya.or.ke/>



Biodiversity in the garden: chameleon in the bean patch at Michinda Primary school; the challenge of making a school garden at Lomayana Primary in the semi-arid lands near Lake Baringo; intercropping of maize, beans and amaranth in the shamba of Jeremiah Lebene, deputy head of Lomayana school. The school gardening club uses the shamba to show what is possible in semi-arid areas.

School meals in rural Kenya are based on locally grown produce. Many of these schools have access to farmland, where they can grow most of the food used in school kitchens. Some crops are the same as those we grow in Scotland – just different varieties – peas and beans, potatoes, onions, cabbage and kale.



Pulses: Michinda pupils show us the different stages of lentils grown in their garden; red kidney beans being cleaned for use in the school kitchen at Michinda School; a typical simple meal of beans, rice, chapattis and vegetables in Olenguruone, Nakuru county.

Pupils eat the same food nearly every day. The diet is traditional - simple and highly nutritious, largely vegetarian, with most protein coming from a balance of legumes and cereals and other vital nutrients from fresh greens. In Michinda Boys' Boarding School, the pupils have a bowl of *githeri* – a mix of beans, potatoes and maize, with the addition of spices and fresh greens, such as spinach or kale - for lunch five days a week, with a variation two days a week, including fish or meat, also produced on the school farm.



Feeding livestock on crop residues: Some small-scale farmers use zero-grazing for their livestock, a practice in many areas of the world, where land is scarce or fencing not possible. Dried legume and maize plants are chopped to provide valuable protein in the diet of housed livestock. Some herders take their animals into fields to graze on crop residues.

If your school wishes to join the Kenyan Connections partnership, please contact prodway@soilassociation.org.

Other resources

There are several related resources on the Crofting Connections website:

<http://www.croftingconnections.com/schools/resources>

These include:

Soils of the Crofts: In celebration of the International Year of Soils 2015, we have produced three posters (sent to schools in December) and a second edition of **Soils of the Crofts**, in collaboration with the James Hutton Institute. Packs of the new book, with a teachers' guide, will be sent for sharing within each local authority. See links to this and other soils resources, including a report on Kenya soils, on our website.

Heritage Potatoes: you will find information on growing heritage potatoes on the website. We have also sent out **A Guide to Seed Potato Varieties** by Alan Romans, who has a lifetime's experience in the Scottish potato industry - a useful booklet on commonly available potato varieties, which includes a brief history of the potato and useful information on growing, harvesting and storing potatoes. Let us know if you would like a copy.

Cereals: This year we have only sent one pack of cereals. Bere has been grown in the Highlands and Islands of Scotland for many centuries, possibly millennia. It is the oldest cultivated cereal on the planet. It is a nutritious food, still grown, milled and used to make bannocks in Orkney. You will find worksheets on:

- * growing traditional cereals and saving the seed;
- * milling grains – many of you will also have a small hand-operated grain mill;
- * making bannocks – the traditional griddle-baked bread of the Highlands and Islands.

Links to other resources:

Peasemeal is still milled in Golspie Mill. It was used traditionally to thicken soups and make peasemeal porridge, but can be adapted for a modern diet. See - <http://www.golspiemill.co.uk/products/products-list.html>

Learning for Sustainability

Scotland's First Minister was one of the first heads of state to sign up to the UN Sustainable Development Goals (SDGs) in New York in September 2015. The Learning for Sustainability Scotland network promotes the UN SDGs in education and in civil society. See - <http://learningforsustainabilityscotland.org/>

The UN SDGs are linked to other initiatives in food and farming as we strive to create a more sustainable world for future generations. You will find some very useful information in the following links:

- * **The UN International Year of Family Farming 2014** – Family farming is inextricably linked to national and global food security. Both in developing and developed countries, *including the crofts in Scotland and the shambas in Kenya*, family farming is the predominant form of agriculture in the food production all over the world - see <http://www.fao.org/docrep/019/mj760e/mj760e.pdf>.
- * **The UN International Year of Soils 2015** – Healthy soils are the basis for healthy food production. They support the planet's biodiversity and help to combat and adapt to climate change by playing a key role in the carbon cycle. Soils store and filter water, improving our resilience to floods and drought. Soil is a non-renewable resource, so *its preservation is essential to our food security and our sustainable future* – see <http://www.fao.org/soils-2015>.
- * **The UN International Year of Pulses 2016** - Pulses are highly nutritious and have important health benefits. They provide an economically accessible protein source throughout the world and contribute to food security at all levels. *Pulses foster sustainable agriculture and contribute to climate change mitigation and adaptation*. They play a vital role in soil improvement and promote biodiversity – see <http://www.fao.org/pulses-2016> and <http://www.fao.org/pulses-2016/communications-toolkit/fact-sheets/en/>

Other resources from FAO:

How to get kids to eat more pulses: <http://www.fao.org/pulses-2016/news/news-detail/en/c/385357/>

Recipes for using pulses: <http://www.fao.org/pulses-2016/recipes/en/>

Eating well for the whole family: <http://www.fao.org/pulses-2016/news/news-detail/en/c/382981/>