



New Start Community Garden
Garden Curriculum

Created By:

Taryn Koerker, M.S. & Niallah A. Young, MAEd





NEW START COMMUNITY GARDEN

GARDEN CURRICULUM

The purpose of this curriculum is to provide educational materials to support student and community visitors to the New Start Community Garden, aka the Shark Garden. It is designed for ages 10 and up and many lessons and activities can be used at home as well as in the garden. Our goal is to create inclusive curriculum that encourages sustainable organic gardening, environmental stewardship, and multicultural appreciation for food. For more information about the Shark Garden, contact info@sharkgarden.org

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Staple Crops Around the World



A crop is a plant that can be grown and harvested for food or profit. By use, crops fall into six categories: food crops, feed crops, fiber crops, oil crops, ornamental crops, and industrial crops. Food crops, such as fruits, vegetables, and grains, are harvested to feed the more than 7 billion people on Earth. Climate, accessibility, trade, and culture are just some of the geographic factors that influence the popularity of a food crop in a given region.

Grains, such as corn, wheat, and rice, are the world's most popular food crops. In fact, these crops are often the basis for food staples. A food staple is a food that makes up the dominant part of a population's diet. Food staples are eaten regularly—even daily—and supply a major proportion of a person's energy and nutritional needs. Cassava, maize, plantains, potatoes, rice, sorghum, soybeans, sweet potatoes, wheat, and yams are some of the leading food crops around the world.

Staple Crops Around the World



A staple food is one that is eaten regularly and in such amounts that it is a main part of a population's diet, supplying a significant amount of energy and nutrition. A staple crop, by definition, dominates the major part of our diet and supplies a major proportion of our energy and nutrient needs. If staple crops are threatened by drought, pests or nutrient-poor soils, hunger and poverty can rise dramatically. These crops are in such high demand that they need to be high-yielding and resistant to pests, diseases and environmental stresses. There are more than 50,000 edible plant species on the planet, but only a few hundred contribute meaningfully to our diet.

In fact, just 15 crops provide 90 percent of global energy intake and “the big four” – maize, rice, wheat and potatoes – are staples for about 5 billion people. Such reliable, widespread crops are the basis of food systems and human subsistence. Plant science technologies, such as crop protection products and biotech seeds, have helped keep these staples stable, even in the face of climate change.

The most productive staple crop in the world is maize, which yielded 1.1 billion tons in 2019 alone, followed by wheat, rice and potatoes at 765, 755 and 370 million tons, respectively. But what about staple crops beyond these heavy hitters? Here is a look at the unsung heroes of agriculture. In different parts of the world, they help feed rural communities and entire countries, with more nutrients than the big four.

Staple Crops Around the World

Typically, people live on a diet based on one or more of the following staples: rice, wheat, corn, millet, sorghum, roots and tubers (such as potatoes, cassava, yams and taro), and animal products such as meat, milk, eggs, cheese and fish. Rice feeds almost half of humanity. Roots and tubers are important staples for over one billion people in the developing world, of which, approximately 40% are consumed by half the population of sub-Saharan Africa.

Tubers

Tubers are high in carbohydrates, calcium and vitamin C, but low in protein. However, per capita consumption of roots and tubers has decreased in many countries since the early 1970s, mainly because urban populations have found it cheaper and easier to buy imported cereals. Habits are changing and increasing global reliance on a handful of plants. For instance, rice consumption in the Pacific Islands has risen by 40% since 1970, while root and tuber consumption dropped by 8%. Although cereal grains and tubers make up the majority of food staples, they are not the only dominant foods in the world.

Fruits & Legumes

People in tropical climates rely on starchy fruits such as plantains and breadfruit. In parts of Africa and Asia, especially India, legumes such as beans, lentils, and chickpeas are staple foods. Economic development, increase in income and free trade are contributing factors as to why many countries have shifted away from traditional foods. Despite this trend, there is growing recognition of the importance of traditional staple crops in nutrition.

Staple Crops Around the World: Cassava



Cassava is a staple for more than 600 million people across Africa, Asia and Latin America. Cassava is a nutty-flavored, starchy root vegetable or tuber. Native to South America, it's a major source of calories and carbs for people in many countries. Nigeria, Thailand, and Indonesia are the top cassava-producing countries in the world. It is an excellent source of vitamin C and a good source of fiber and potassium. The Food and Agriculture Organization of the United Nations identified it as a vital crop in the fight against hunger and formed a partnership to bolster its genetic improvement.

Cassava is grown by many farmers in developing countries due to its ability to thrive in poor soils as it requires less water and fertilizer than alternatives and can be harvested anytime from eight to 24 months after planting, meaning it can be left in the ground as a living food store. The only caveat is that long periods in the soil makes cassava more susceptible to pests and diseases. Cassava farmers have typically struggled with these challenges as the crop is notoriously resistant to traditional plant breeding techniques due to unreliable flowering patterns.

However, gene-edited cassava flowers more reliably giving researchers great hope for the future of this crop. Biotech varieties could help control pests and diseases as well as enhance yields and nutrition. Although both sweet and bitter varieties of cassava are available, sweet cassava is more common in the United States, where it's often referred to as yuca, manioc, or Brazilian arrowroot. The most commonly consumed part of the cassava plant is the root, which is incredibly versatile. You can eat it whole, grated, or ground into flour to use it in bread and crackers. Individuals with food allergies can benefit from using cassava root in cooking and baking because it's free of gluten, grains, and nuts. It's important to note is that you must cook cassava root before eating it, as it can be poisonous if consumed raw. This crop has untapped potential; experts estimate that introducing such varieties could increase cassava production in Africa by 150 percent.

Staple Crops Around the World: Corn/Maize



Corn, known outside the United States as maize, is native to Central America, where it was domesticated by the Aztecs and Mayans. Corn remains the most widely grown crop in the Americas today. The United States is the world's largest corn grower, producing more than 40 percent of the world's corn. China, Brazil, Mexico, and Argentina also produce large amounts of corn.

Corn is used in a variety of ways, and can be stored relatively easily. This is why it is such a popular food staple.

Dried, ground corn is called cornmeal. Many cultures make porridge out of cornmeal, including polenta in Italy and sadza in Zimbabwe. Cornmeal is also used to make cornbread, or treated with limewater to make masa, the main ingredient in tortillas.

Corn kernels can be soaked in lye to produce hominy. Coarsely ground hominy is used to make grits, a popular food in the southeastern United States. Grits are a popular breakfast food, as are corn flakes and other cereals made from corn. Brazilians make a dessert called canjica by boiling corn kernels in sweetened milk.

In the Americas and the United Kingdom, many people like to boil, grill, or roast whole ears of corn and simply eat the kernels off the cob. Cooked kernels may also be removed from the cob and served as a vegetable. Certain varieties of corn kernels, when dried, will explode when heated, producing popcorn.

Corn is also used to produce corn oil, sweeteners such as corn syrup, and cornstarch, which is used as a sweetener and thickening agent in home cooking and processed food products. Alcohol from fermented corn is the source of bourbon whiskey.

Staple Crops Around the World: Millet



Of all the world's cereals, pearl millet is the sixth most important. Descended from a wild West African grass, it was domesticated more than 4,000 years ago, probably in what is now the heart of the Sahara Desert. Long ago it spread from its homeland to East Africa and thence to India. Both places adopted it eagerly and it became a staple.

Today, pearl millet is so important that it is planted on some 14 million hectares in Africa and 14 million hectares in Asia. Global production of its grain probably exceeds 10 million tons a year, to which India contributes nearly half. At least 500 million people depend on pearl millet for their lives.

Despite its importance, however, pearl millet can be considered a "lost" crop because its untapped potential is still vast. Currently, this grain is an "orphan" among the significant cereals. In fact, few people outside of India and parts of Africa have ever heard of it. As a result, it lags behind sorghum and far behind the other major grains in its genetic development.

Now, however, a new era may be dawning. Pearl millet is supremely adapted to heat and aridity and, for all its current decline, seems likely to spring back as the world gets hotter and drier. Perhaps the best of all "life-support" grains, pearl millet thrives where habitats are harsh. Of all the major cereals, it is the one most able to tolerate extremes of heat and drought. It yields reliably in regions too hot and too dry to consistently support good yields of maize (or even sorghum). These happen to be the regions most desperately in need of help. It is there that the famines of recent decades have brought mass devastation and death. And it is there that agricultural development could have its greatest humanitarian benefits.

Staple Crops Around the World: Potatoes



The potato is a plant that is part of the nightshade family, which also includes tomatoes, peppers, and eggplant. The potato plant is an annual that grows best in cool climates and can be found in different colors, shapes, and sizes. The potato is a starchy tuber that is high in carbohydrates and is a popular food choice around the world.

While the potato is not considered a true grain, it is often used as a substitute for grains in many recipes. The potato is native to the cold climate of the Andes region of South America and was first domesticated by the Inca people. Potatoes were brought to Europe by Spanish explorers in the 16th century and quickly became a staple crop in many countries. Today, potatoes are grown on every continent except Antarctica and are one of the world's most popular vegetables. The leading potato producers are China, Russia, India, the United States, and Ukraine.

In the United States, potatoes are most commonly grown in Idaho, Washington, and Oregon. While potatoes are often thought of as a healthy food, they can actually be quite unhealthy if they are fried or covered in butter and sour cream. Potatoes are a good source of vitamins and minerals, but they should be eaten in moderation as part of a balanced diet.

Staple Crops Around the World: Rice



Rice is a food staple for more than 3.5 billion people around the world, particularly in Asia, Latin America, and parts of Africa. Rice has been cultivated in Asia for thousands of years. Scientists believe people first domesticated rice in India or Southeast Asia. Rice arrived in Japan in about 3,000 years ago. The Portuguese most likely introduced it into South America in the 16th century.

The Asian species of rice can be further broken down into thousands of indigenous varieties. They come in many sizes, leaf colors, husk colors, seed sizes, habitat characters, and even fragrances. They grow in very high altitudes such as in the Himalayas, on the sea coast, and in all other kinds of landscapes. The red rice and black rice have red and black husks respectively, and they are known for their antioxidant properties.

For an Indian farmer, rice is a divine offering to gods. In Indian culture and agricultural practices, there are many rituals that put rice in the center of worship. Before the tilling of the land, the farmer may worship the earth using rice and flowers. When the godman comes to the village to pronounce the blessings and forewarnings from gods, people welcome him by throwing a handful of rice over his head. Certain communities daily decorate their courtyard by drawing elaborate and symmetric patterns in front of their front boor using rice powder made into a paste using water.

Today, the world's largest rice producers are China, India, and Indonesia. Outside of Asia, Brazil is the largest rice producer. Rice grows in warm, wet climates. It thrives in waterlogged soil, such as in the flood plains of Asian rivers like the Ganges and the Mekong. "Deepwater rice" is a variety of rice that is adapted to deep flooding, and is grown in eastern Pakistan, Vietnam, and Burma.

Staple Crops Around the World: Sorghum



Times-Union



Sorghum

High in protein and potassium, sorghum has been a staple crop in semi-arid areas of Asia and Africa, for hundreds of years and millions of people rely upon it. This crop is well-liked by farmers due to its ability to thrive in harsh environments where other crops grow poorly or fail. It is the only viable grain and plant protein for many of the world's most food-insecure people.

Most varieties are heat- and drought-tolerant, while higher-yielding dwarf varieties have seen increasing commercial production in countries like the United States. Combining these varieties with modern crop protection and smart water management can see yields increase by as much as eight times.

Sorghum's natural qualities make it ideally suited for drought-susceptible regions, with climate change expected to further enhance its status as one of the most important cereal crops on the planet. This led to it being selected for biofortification, as natural varieties contain a compound that reduces the body's ability to use iron and zinc, which can cause anemia. These new varieties tackled this challenge while also gaining beta-carotene, which the body converts into vitamin A. This is a great example of plant science improving nutrition for some of the world's most vulnerable people.

With populations and food systems across the world facing the impacts of climate change, combined with the ever-increasing need for farmers to produce more with less, safeguarding staple crops is more important than ever. While "the big four" of maize, rice, wheat and potatoes are caloric powerhouses, other staple crops offer more nutritionally like soybeans, cassava, sweet potatoes, yams and sorghum.

Staple Crops Around the World: Soybeans



Soybean



Soybean Images



Soybean

Soybeans have been grown as a crop for thousands of years. As legume plants, they fixate nitrogen, absorbing this essential nutrient from soil bacteria, which is a talent most crops lack. This means fertilizer is usually not needed when growing soybeans. Moreover, plant science technologies have led to higher and higher soybean yields. No wonder they are one of the world's fastest expanding crops!

While low-carb soybeans are highly prized for their oil, they are considered a staple food because of their protein. They are among the best sources of plant-based protein in the world, plus contain vitamins and minerals. They are processed into milk, tofu, tempeh, soy sauce, and other high-protein products. Japan and China are major consumers of these foods.

Global soybean production is concentrated in Brazil and the United States on sizeable farms, but the crop is also grown in many other countries by smallholder farmers. In both developed and developing countries, the adoption of biotech soybean varieties has more than doubled yields since the 1960s. That's why these varieties account for up to 81 percent of global production. Herbicide-resistant biotech soybeans also reduce greenhouse gas emissions by as much as 80 percent as they allow for no-till farming, which keeps carbon in the soil.

Staple Crops Around the World: Sweet Potatoes



Sweet potatoes are vital in the diets of people in parts of Africa and Asia, where they are a major source of subsistence. They are a rich source of vitamin A and a good source of fiber. They come in a variety of sizes and colors — including orange, white, and purple — and are rich in vitamins, minerals, antioxidants, and fiber. In addition, sweet potatoes — especially the orange and purple varieties — are rich in antioxidants that protect your body from free radical damage and chronic disease. Sweet potatoes contain fiber and antioxidants that promote the growth of good gut bacteria and contribute to a healthy gut. Sweet potatoes are also rich in beta carotene and anthocyanins, antioxidants that may help prevent vision loss and improve eye health. Sweet potatoes can be used in both sweet and savory recipes to add additional flavor and health benefits to your plate!

Drought-tolerant sweet potatoes grow incredibly well and do not require a large degree of care. Farmers are sweet on these qualities so these potatoes have expanded faster than all other staple crops in sub-Saharan Africa in the last 20 years. They have also attracted the attention of researchers who would like to use sweet potatoes to improve the health of children.

In rural sub-Saharan Africa, around 48 percent of children have a vitamin A deficiency. This can degrade immune systems, increasing the risk of diarrhea and even causing blindness. In 2009, this dire situation led to the formation of the Sweet Potato for Profit and Health Initiative, which developed varieties with greater virus resistance, drought tolerance and lower sugar levels. It led to commercial production of orange-fleshed sweet potato biofortified with beta carotene. This variety significantly raises vitamin A levels in children, further cementing the sweet potato's status as a vital staple.

Staple Crops Around the World: Wheat



Wheat was first domesticated in the Middle East, in the area known as the Cradle of Civilization near what is now Iraq and researchers believe this was the first domesticated crop. Domesticating this reliable, versatile staple food was key to the development of agriculture.

Wheat grows well in temperate climates, even those with a short growing season. Today, China, India, the United States, Russia, and France are among the largest wheat producers in the world.

The majority of breads are made with wheat flour. Wheat flour is also used in pasta, pastries, crackers, breakfast cereals, and noodles. Its nutritional value is higher, however, when it is consumed whole. Approximately 15% of the world's calorie intake comes from wheat. Wheat can be crushed into bulgur, which has a high nutritional value and is often used in soups and pastries in the Middle East, prompting the spread of agriculture, and resulting in rapid increases in human population. The US, China, Russia, India, and France are the largest producers of wheat in the world.

More of Earth's surface is covered by wheat than by any other food crop, despite it trailing maize and rice in the sheer amount of tons harvested. About 65% of wheat harvested is used for food, 17% for animal feed, 12% for industrial use such as bio-fuels, and the rest for various uncategorized uses.

Staple Crops Around the World: Yams



Yam Belt

Known as an “orphan crop” due to not being widely traded, yams are a staple food for more than 100 million people in the tropics, particularly western and central Africa. They are “yam-packed” with vitamin C, potassium and fiber.

Contrary to popular belief, yams are distinct from sweet potatoes; they are less sweet, more starchy, larger and cylindrical with bark-like skin that’s difficult to peel and flesh that’s purple or pink when mature. Yams can grow up to 4.9 feet and about 32 pounds!

Indigenous to Africa and Asia, with more than 600 varieties, yams are now also commonly grown in the Caribbean and Latin America. Farmers favor them as they can be stored for four to six months without refrigeration, giving people a vital safety net between growing seasons.

The yam’s orphan status has led to a recent research push into biotech improvements. The genetics of yams are the least understood among major staple food crops, partly due to biological restraints. The domestication of wild yam species is ongoing in Africa, further widening the genetic base. As such, this crop has more potential for biotech innovation than any other major staple and efforts to improve the yam’s disease resistance and yield are underway.

Staple Foods Around the World: Recipes

Authentic Spanish Rice Recipe

Author: firstdayofhome.com

This authentic Spanish rice recipe (Mexican rice recipe) is moist and full of texture with freshly chopped tomato, onions, garlic, and bell pepper and an optional garnish of cilantro.

It's a traditional recipe that's easy to prepare and has been passed down through generations of Mexican-Americans.



INGREDIENTS

- ¾ cup white rice
- 3 tbsp vegetable oil
- 1 medium tomato (chopped fine)
- 1 clove garlic (minced)
- ½ white onion (quartered or diced)
- 2-3 strips bell pepper
- 1 tbsp granulated chicken bouillon
- 1 ¾ hot water

INSTRUCTIONS

- Saute rice in 3 tablespoons of oil on medium heat until golden brown (about 5-7 minutes). Stir constantly to brown the rice evenly.
- Add the onion, garlic, and bell pepper and saute 1 minute.
- Add the diced tomato and cook slightly.
- Add the chicken bouillon and stir just to coat the rice.
- Immediately add about 1 ¼ cups of the hot water, reserving some liquid to add back later as needed. Stir the rice and bring to a boil.
- Reduce heat, cover and simmer for 20-25 minutes until tender. Check the rice at 15 minutes to add more water and/or adjust the temperature as needed.
- Let stand 5 minutes before serving.

Staple Crops Around the World: Thai Mango Coconut Sticky Rice

The classic Thai dessert known as khao niaow ma muang (mango sticky rice) is heavenly and scrumptious. Famously served as street food in Thailand and at Thai restaurants throughout the world, the taste of this tropical rice pudding is irresistible—and it's easy to make at home.

This mango sticky rice recipe requires just a few ingredients. Use the ripest mangoes or any type of your favorite fruit from the garden you can find, good-quality coconut milk (avoid "lite" options), and Thai sweet rice. Also called glutinous rice or sticky rice, it can be found at Asian food stores and well-stocked supermarkets.



Staple Crops Around the World: Thai Mango Coconut Sticky Rice

INGREDIENTS

- 1 cup Thai sweet rice (aka sticky rice)
- 1 1/2 cups water, divided
- 1 (13.5-ounce) can coconut milk, divided
- 1/4 teaspoon salt
- 4 to 5 tablespoons brown sugar, to taste, divided
- 1 to 2 ripe mangoes

Recipe by The Spruce Eats



Mango Sticky Rice

METHOD OF PREPARATION

1. Soak the rice in 1 cup water in a medium pot for 20 to 30 minutes. Do not drain the rice.
2. Add 1/2 cup more water, plus 1/2 can of the coconut milk, the salt, and 1 tablespoon of the brown sugar. Stir well. Bring to a gentle boil, then partially cover with a lid (leaving some room for steam to escape). Reduce heat to medium-low, or just until you get a gentle simmer.
3. Simmer 20 to 30 minutes, or until the coconut water has been absorbed by the rice. Turn off the heat but leave the pot on the burner with the lid on tight. Allow it to sit for 5 to 10 minutes.
4. To make the sauce, warm (do not boil) the remaining coconut milk over medium-low heat in a small saucepan (about 5 minutes). Add 3 tablespoons brown sugar, stirring to dissolve. Taste-test sauce for sweetness, adding more sugar if desired. (Note that it will not taste as sweet once added to the rice.)
5. **INGREDIENTS** 1 cup Thai sweet rice (aka sticky rice) 1 1/2 cups water, divided 1 (13.5-ounce) can coconut milk, divided 1/4 teaspoon salt 4 to 5 tablespoons brown sugar, to taste, divided 1 to 2 ripe mangoes

Prep:10 mins

Cook:25 mins

Soak Time:20 mins

Total:55 mins

Servings:4 servings

Yield:3 cups

Staple Crops Across the World: Test Your Knowledge

Purpose:

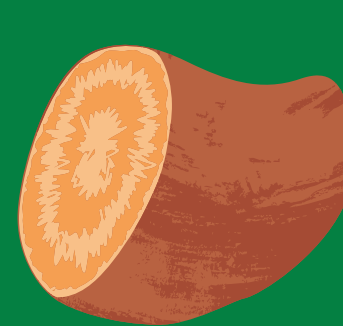
The purpose of this test your knowledge activity is to allow students and visitors of the garden to recollect what has been discussed related to staple crops around the world. During this exercise, students and facilitators will prepare Spanish rice and discuss where the staple crop originated and some qualities of rice.

Estimated Time

30 mins-1 Hour Total

Materials

Large Rice/Saute pan
Silicone Spatula
Silicone Spoon
Paper Plates
Plastic Silverware
Spanish Rice Recipe & Ingredients



Staple Crops Across the World: Spanish Rice Recipe

Directions:

The facilitator will first discuss how to prepare the Spanish rice recipe.

After the explanation, each group of students will be broken into groups of three people and one facilitator per group.

Each group member will be responsible for following the recipe and given two tasks per person.

During the cooking activity students will be asked:

- Which country do you remember that rice originated from? And what type of climate is needed for rice to grow and thrive? (Asia)
- What other countries utilize rice as a staple crop? (Brazil, India)
- What are some other ways that you can use rice in your kitchen? (Rice flour, Coconut Mango Sticky Rice, Spanish Rice, Sushi, Cilantro Lime Rice, Red Beans & Rice)

Sources

Ajmera, R. (2023, April 19). Cassava benefits and dangers. Healthline. <https://www.healthline.com/nutrition/cassava#what-it-is>

Beyond the Big Four – Staple Crops Around the World. (n.d.). CropLife International. <https://croplife.org/news/beyond-the-big-four-staple-crops-around-the-world/>

Food Security & Staple Food. (n.d.). IAEA Bulletin. <https://www.iaea.org/sites/default/files/publications/magazines/bulletin/bull53-3/53305711111.pdf>

Leigh, W. (2022, August 9). Why The African “Yam Belt” Is Crumbling. Tasting Table. <https://www.tastingtable.com/958505/why-the-african-yam-belt-is-crumbling/>

Mango Sticky Rice Coconut Rice Pudding . (2020). photograph.

National Geographic . (n.d.). Food staple. Education. <https://education.nationalgeographic.org/resource/food-staple/>

Rice: The staple diet of half the world - owlcation. Owlcation. (n.d.). <https://owlcation.com/agriculture/Rice-The-Staple-Diet-of-Half-the-World>

Sorghum: Benefits, Recipes, Health Risks, And More. (2023, July 7). STYLECRAZE. <https://www.stylecraze.com/articles/sorghum/>

Soybean | Description, Cultivation, Products, & Facts |. (2023). photograph.

Soybean Images: Browse 191,590 Stock Photos & Vectors Free Download with Trial | Shutterstock. (n.d.). Shutterstock.
<https://www.shutterstock.com/search/soybean>

Staple Food Crops of the World. (n.d.).
<https://education.nationalgeographic.org/resource/wbt-staple-food-crops-world/>

Thai Mango Sticky Rice Dessert (Khao Niao Ma Muang). The Spruce Eats . (2022, August 5). <https://www.thespruceeats.com/mango-sticky-rice-dessert-3217361>

Times-Union, K. H. a. D. O. F. T. T. F. (2018, November 27). Sorghum finding its way into U.S. diet. Florida Times-Union.
<https://www.jacksonville.com/story/lifestyle/food/2018/11/27/goods-sorghum-finding-its-way-into-us-diet/8279077007/>