

Welcome to Pokok-Ed!

Pokok-Ed is an educational simulation of palm oil cultivation in countries such as Indonesia, Malaysia, and Cameroon, designed for classroom use, aimed at ages 12 through 16, though suitable for any age 12+ (due to inclusion of aspects such as child labor).

Questions, concerns, and/or feedback? Contact maanitgoel@gmail.com.

OBJECTIVES

Educate students about:

- The palm oil cultivation process for smallholder farmers in developing regions
- How issues such as child labor and rainforest deforestation can arise out of necessity
- Options for sustainable practices in palm oil cultivation
- The consequences of different approaches to sustainability

Mobilize students in consumer markets to take informed approaches towards palm oil sustainability from abroad

Inspire students to consider the global natures of consumer product supply chains, and how consumer choices abroad can influence sustainable and ethical practices in producer regions

GAME MECHANICS

The player's goal in playing the game is to keep their plantation running for as many years as they can, and reach the highest score possible.

There are three cases that can result in an end to the game: the player is arrested for illegally deforesting a plot of land, a species goes extinct due to low forest cover, or the player's available money reaches \$0 or less.

The player's score is determined by a number of factors. The player's score increases for every child in school each season. The score decreases for each child participating in child labor each season. The score will generally increase over time, incentivizing the player to keep the plantation in business as long as possible. Deforestation will decrease the player's score, though healthy forest cover will provide a positive contribution. If the player is caught illegally deforesting, their score will be halved before the game ends. If a species goes extinct, the player's score will be reduced to a third of its value before the game ends. Deforestation (expanding the plantation) will decrease the player's score by 10%, but can increase the player's revenue per crop.

Upon launching the game, two modes will be present for the user to choose from:

Standard:

- Starter mode
- Suitable for beginners/first-time play
- Limited player options
- Focus on exploring fundamental aspects of palm oil cultivation as a smallholder

Eco-Conscious:

- Advanced mode (play after Standard)
- Expanded player options
- Preparations phase includes options for sustainability certification and regulations on deforestation and child labor by Year 3
- Consumer demand for sustainability may arise, potentially affecting smallholder revenue

If the player has played the game before, their high score, stored locally, will be displayed on the Welcome screen.

Upon selecting a mode, the player will be taken to the main gameplay screen, where they will be met with an info panel on the right side of the screen. In order to flip through the info panel screens, or continue once the player has finished reading through the information provided, the player can click anywhere on the screen off of the info panel.

Small popups on the bottom right may occasionally slide into frame, providing action receipts and minor updates. These popups cannot be interacted with, and will automatically disappear from view after a few seconds.

Major updates, such as an increase in consumer demand for sustainability, the extinction of a species, or an extremely low harvest season, will be displayed on popups in the center of the screen. To continue from these popups, the player can click anywhere off of the popup.

Each in-game year consists of two seasons: High season, in which crop harvests are notably more abundant, and low season, in which crop harvests are roughly a third of high season harvests.

Each season consists of three phases: Preparations, Harvest, and Sale. Instructions for each will be provided in-game.

CURRICULUM STANDARDS

WASHINGTON

GRADE 8:

Grade 8 Environmental and Sustainability Standards Connections

ESE Standard 1: Ecological, Social, and Economic Systems. Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels.

ESE Standard 2: The Natural and Built Environment. Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.

ESE Standard 3: Sustainability and Civic Responsibility. Students develop and apply the knowledge, perspective, vision, skills, and habits of mind necessary to make personal and collective decisions and take actions that promote sustainability.

MS-ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

SSS3.6-8.1: Engage in discussion, analyzing multiple viewpoints on public issues.

C3.6-8.6: Analyze how the United States has interacted with other countries.

E1.6-8.3: Analyze examples of how groups and individuals have considered profit and personal values in making economic choices in the past or present.

E2.6-8.6: Analyze how the forces of supply and demand have affected international trade in the United States in the past or present.

GRADES 9-10:

Grade 9-10 Environmental and Sustainability Standards Connections

ESE Standard 1: Ecological, Social, and Economic Systems. Students develop knowledge of the interconnections and interdependency of ecological, social, and economic systems. They demonstrate understanding of how the health of these systems determines the sustainability of natural and human communities at local, regional, national, and global levels.

ESE Standard 2: The Natural and Built Environment. Students engage in inquiry and systems thinking and use information gained through learning experiences in, about, and for the environment to understand the structure, components, and processes of natural and human-built environments.

ESE Standard 3: Sustainability and Civic Responsibility. Students develop and apply the knowledge, perspective, vision, skills, and habits of mind necessary to make personal and collective decisions and take actions that promote sustainability.

HS-LS2-7: Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

HS-LS4-6: Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.

SSS1.9-12.5: Explain the challenge and opportunities of addressing problems over place and time using disciplinary and interdisciplinary lenses.

SSS3.9-12.6: Assess options for individual and collective action to address local, regional, or global problems by engaging in self-reflection, strategy identification, and complex causal reasoning.

E1.9-10.2 Analyze how choices made by individuals, firms, or governments are constrained by the resources to which they have access.

E2.9-10.3 Analyze how and why countries have specialized in the production of particular goods and services in the past or present.

E4.11-12.3 Evaluate how individuals and different groups affect and are affected by the distribution of resources and sustainability.

G2.9-10.3 Explain that the environment is modified through agriculture, industry, settlement, lifestyles, and other forms of activity

LESSON PLAN (90 minutes; can be split between two class periods)

Optional PowerPoint to accompany

NECESSARY RESOURCES FOR STUDENTS:

- Personal Laptop which can download application (~44 MB)
 - o School-provided device works if without restriction on downloading necessary software

OR

- Laptop with internet access (Chrome Browser does not work!)

OR

- Mobile Device with Internet access (Chrome Browser works! Safari does not.)

5 mins: Have students fill out first segment of pre-lesson form, and download Pokok-Ed

- <https://tinyurl.com/prepokok>
- Filling out the pre-form and post form allow us to track educational value for players, as well as track our reach!

15 mins: Provide brief introduction to palm oil deforestation and Pokok-Ed **(INCLUDED IN PPT)**

1. Recommended video resources to play for class:

<https://youtu.be/0o6WHN4NDTk> ('Protect Paradise' – GreenPeace International) **(0:00-2:29)**

2. Establish that palm oil is, as of 2022, the most consumed vegetable oil in the world:

[\(FAOSTAT, 2022\)](#)

Rank	Vegetable Oils	Production in 2019
		(Tonnes)
1	Palm Oil	74,583,225
2	Soybean Oil	59,904,292
3	Rapeseed Oil	24,407,916
4	Sunflower Oil	20,054,680
5	Cottonseed Oil	4,446,766

3. Establish that 85% of the world's palm oil is sourced from Indonesia and Malaysia [\(World Wildlife Fund\)](#)

4. Ask preliminary discussion questions encouraging students to consider variety of impacts of current palm oil practices. Engage in brief class discussions (have a few students share), and have all students respond in second segment of pre-lesson form. Do not provide 'correct' answers- allow students to brainstorm, and emphasize that it is ok to be partially or wholly incorrect.

QUESTIONS:

- i. What are some negative and positive consequences of palm oil production in regions such as Indonesia and Malaysia?
 - ii. How is palm oil production in regions such as Indonesia and Malaysia, among others, tied to climate change?
 - iii. What parties/groups of people are affected by actions taken in the process of palm oil production and expansion?
 - iv. How are consumers, corporations, and legislation in the United States tied to palm oil cultivation abroad?
 - v. Are there actions that the United States or its residents can take to address the regional and global impacts of palm oil cultivation?
5. Review 'Objectives' provided on page 1 with students, to establish purpose of simulation gameplay

20 mins: Gameplay (Standard mode)

6. Guide students through one round of play, if deemed necessary by class.
7. Have students play through Standard mode of game.
 - a. Emphasize that students are in the shoes of palm oil smallholders, whose household incomes and livelihoods are fully dependent on the success of the plantation over time. Do not explicitly tie success to in-game score or years of plantation operation.
 - b. Refrain from commenting on aspects such as child labor, deforestation (legal or illegal), or other player options, beyond answering questions on how to operate the game.
 - c. If students ask about penalties regarding the use of child labor, plant expansion, illegal deforestation, or other actions, do not provide any information beyond the function of the action itself (e.g. for child labor, you may reiterate that pressing the child labor button will take one of your children out of school to work on the plantation, but do not mention effects on score, long-term benefits, or morality).
 - d. If students' games end prematurely, remind them to restart and continue playing, perhaps with a new strategy.
 - e. Encourage students to experiment with all the options available to them.
 - f. Halfway through the allocated times, ask students to raise their hands if they have used child labor on their plantation or if they have illegally deforested. If few students raise their hands, encourage students to fully explore the possibilities.
 - g. Allow students to discuss between themselves during gameplay, to help each other experiment with new strategies.

10 mins: Class Discussion

Suggestion: Break students into groups to discuss, and then discuss as class

8. Questions for class (to be open-ended, in this segment)
 - a. What strategies were successful or unsuccessful during the game?
 - b. Ask students to define success in the game, and the reasoning for their decisions
 - c. What might the in-game score represent?
 - d. What values might palm oil smallholders have to weigh when operating a plantation? What actions may arise out of necessity? Are there ways to avoid these consequences?
If students do not mention child labor and/or deforestation: ask why child labor/old-growth rainforest clearing can occur in palm oil growth

20 mins: Gameplay (Eco-Conscious mode)

9. Inform students that Eco-Conscious mode gameplay is mostly analogous to Standard mode, though with additional complexities to reflect the modern realities of the palm oil supply chain, with a focus on different sustainability and ethics approaches.
10. Have students play through Eco-Conscious mode of game.
 - a. After at least 5 minutes have passed, ask students how many years their current plantation has been operating. If students are on year 3 or more, there should be additional options available to them in the Preparations phase, including the option for regulations as well as training for a sustainability certification. Encourage students to entertain these options during gameplay.
 - b. Allow students to discuss between themselves during gameplay, to help each other experiment with new strategies.

10 mins: Class Discussion

Suggestion: Break students into groups to discuss, and then discuss as class

Questions for class (to be open-ended, in this segment)

11. What was different, and what stayed the same?
12. What strategies were successful or unsuccessful during the game?
13. How did different sustainability measures, whether external or player-enforce, affect the environment?
14. How did different measures affect plantation success?
15. What did you learn about the consequences of different sustainability approaches?
16. What role do consumer markets play? How might consumer factors affect the actions of palm oil smallholders?
17. How can consumer markets address deforestation/child labor in palm oil cultivation regions?

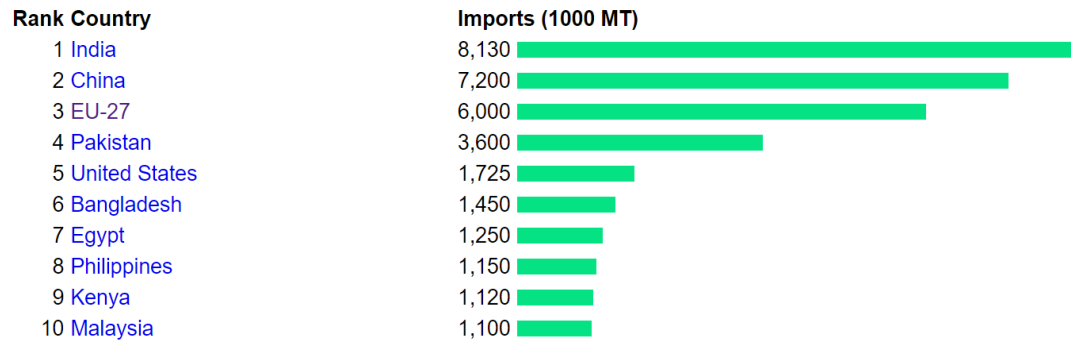
10 mins: Debriefing

18. Summarize lessons learned
 - a. Palm oil is a widely-used vegetable oil crop often sourced from old-growth rainforest regions including but not limited to Indonesia and Malaysia

- b. Deforestation caused in palm oil plantation expansion can result in habitat fragmentation and loss for endangered animals such as orangutans and tigers, which can ultimately lead to extinction
- c. Local livelihoods are often tied to the success of family-owned ‘smallholder’ plantations
- d. Total bans on palm oil, while perhaps short-term solutions to rainforest deforestation in producer regions, would compromise the livelihoods of many local farmers reliant on palm oil production for income
- e. Sustainable certifications, such as the Roundtable for Sustainable Palm Oil (RSPO) standard, when provided with relevant training, can simultaneously benefit palm oil smallholders and the environment when combined with sustainable demand in foreign markets

19. Provide additional, external information as necessary

- a. “Palm oil is by far the most efficient vegetable oil to grow as it takes less land to produce than other vegetable oils” (“Which Everyday Products Contain Palm Oil?”, *World Wildlife Fund*)
 - i. Outright banning palm oil could be detrimental to global ecosystems due to further deforestation in other regions for more land-intensive oil alternatives
- b. The United States is the fifth largest importer of palm oil, with an estimated 1,725,000 Metric Tons imported annually.



(US Department of Agriculture, 2022)

20. While palm oil is an ingredient in approximately half of all packaged consumer products, it is not often clearly labeled, and even when identified in a product, it can be difficult to trace whether it has sustainable sourcing in the absence of an RSPO certification marking. Therefore, it can be difficult for consumers to ‘boycott’ unsustainable palm oil in particular.

21. Ask students: What can consumers do?

- a. If students mention boycotting, or banning, all palm oil imports, remind them of the impacts this could have both on the livelihoods of palm oil smallholders dependent on palm oil sales, as well as the land-intensive alternatives to palm oil that could have large long-term environmental impacts.
 - b. Encourage students to think outside the box
 - c. Potential areas of action you can recommend:
 - i. Encouraging representatives to co-sponsor/support federal legislation restricting untraceable palm oil imports, or imports that do not meet certain sustainability criteria
 - 1. For example, an *'End Palm Oil Deforestation'* act was introduced by Rep. John Garamendi (CA-3) in 2021, but was not voted on due to a lack of widespread understanding of the topic
 - ii. Asking corporations for more transparency in sustainable palm oil sourcing
 - iii. Educating peers and consumers on the importance of sustainable and ethical palm oil sourcing
22. Have students fill out post-gameplay form: <https://tinyurl.com/postpokok>
23. Email teacher testimonials to maanitgoel@gmail.com! Feedback is much appreciated!
24. Encourage students to experiment more in-game after class/at home.

IMPORTANT LINKS

Game Access

Play game online (Recommended):

<https://tinyurl.com/palmoilgame>

(PC/Laptop: Firefox recommended, avoid Chrome due to lag)

(Mobile: Chrome recommended)

If using Safari on mobile, disable 'Prevent Cross-Site Tracking' in iOS Settings > Safari Settings.

Forms

Pre-Gameplay Form (Students):

<https://tinyurl.com/prepokok>

Post-Gameplay Form (Students):

<https://tinyurl.com/postpokok>

PowerPoint for Lesson

[Pokok-Ed Ppt.pptx](#)

Contact

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Visit Pokok-Ed at <https://www.pokoked.org>

