

GO FOR THE GREEN

introduction

The destruction of **tropical rainforests** around the world is an enduring and alarming issue. At the current rate of **deforestation** Earth's rainforests would disappear completely in a hundred years.¹ **Ecosystem services** provided by rainforests, like climate regulation, water and nutrient cycling and soil formation, are important for all life on Earth. This translates to 3 to 5 trillion dollars of benefits in economic terms.² Humans depend more directly on rainforests, too. Many valuable medicines, wood products and foods come from natural sources in rainforests, and millions of indigenous people depend on rainforests for their livelihoods.

Historically, rainforests have been regarded primarily as rich supplies of natural resources and land to be exploited for human interests. Deforestation is driven by converting land for agriculture, urbanization, commercial timber harvesting, mining operations, and other unsustainable practices. And as our human population continues to grow, our demand for food, land, and other resources will only increase. There are no easy solutions to deforestation as governments, businesses, indigenous people, scientists, and other groups differ on how rainforests should be used and managed. How well we can balance human needs and interests with environmental protection and conservation will determine the future of tropical rainforests and many of Earth's vital ecosystems.

Vocabulary: biodiversity, deforestation, ecosystem services, tropical rainforest

materials

For each group:

- Choice and Risk Cards (provided)
- Game Board (provided)
- Dice
- Game pieces

EARTH matters

Studies For Our Global Future

concept

The Earth's rainforests are irreplaceable ecosystems that hold a significant place in the global environment. However, economic interests often pose obstacles to rainforest preservation.

objectives

Students will be able to:

- Assess scenarios and make decisions about the rainforest and related economics based on qualitative criteria.
- List consumer products derived from tropical rainforests.
- Identify economic incentives for converting rainforest land for other purposes as well as for preserving rainforest land.

subjects

Environmental Science (General and AP), AP Human Geography, Geography, Economics, Government

skills

Decision making, analyzing costs and benefits, conflict resolution

method

Students play a board game about the fate of a rainforest where they must strategically balance economic and environmental decisions.

procedure

1. Divide students into groups of 3-5 and distribute one set of game materials to each – Choice Cards, Risk Cards, Game Board, one dice, and one game piece per student (any small item will work, so be creative).

Note: Copying the Choice and Risk Cards on different colors of paper avoids confusion. Each stack of cards should then be placed face down on the game board.

2. Read the Rules of the Game aloud and clarify any questions students have about the game instructions.
3. Allow groups time to play and complete the game.

Rules of the Game

1. Each player will be responsible for keeping track of his/her points through each round. Before the game begins, each student should make a T-chart on a piece of paper with two headings – “Environmental points” and “Wealth points.”
2. Each player will start with four environmental points and 400 wealth points. The winner of the game is the first player to get 10 environmental points **and** 1,000 wealth points.
3. The players may place their game pieces anywhere on the game board to start. Movement around the board is clockwise. Students roll the dice to determine which player goes first – highest roll starts the game.
4. Each player will roll the dice and move around the board the designated number of spaces. After landing on a space, players follow the directions given on the board.
5. If a player is required to pick a Choice or Risk Card, they should pick from the top of the pile, and put the card at the bottom of the pile when they are through.
6. A player may not choose an option on a Risk or Choice Card that would put him/her into debt. For example, if a player has 300 wealth points and he/she picks a Choice Card that has an option to lose 400 wealth points, this option cannot be chosen because the player would go into debt. But, if a Risk Card requires a player to pay 300 wealth points and the player only has 200 wealth points, that player will be in debt for 100 wealth points. In other words, a player may be forced to go into debt, but cannot do so voluntarily.

Note: If you find there is no winner by the end of the allotted time, reward each player 100 wealth points for each environmental point and total each player’s wealth points. The player with the highest number of wealth points will be the winner. It is advisable not to tell the students this rule because it may change their strategy when playing.

discussion questions

1. How did you feel when you drew a Choice Card? Was your decision easy or difficult?

Answers will vary.

2. When you were making decisions, what did you find yourself considering most (environmental impacts, economic impacts, personal beliefs, or something else)?

Answers will vary.

3. Think back to a specific difficult choice you had to make. How did you come to a decision? Was there a better choice not listed on the Choice Card that you can think of?

Answers will vary. Some students may not identify with any of the choices listed on the Choice Card and may want to offer a different idea or approach.

4. Do you think that there is always a 'right' choice that can be made?

Answers will vary. Students may note that when there are many stakeholders involved, it can be difficult to find a clear 'right' choice. The best outcome for one person or group might not be what is best for another.

5. Why is the rainforest important and why should we care about protecting it?

*The rainforest is home to a vast amount of plant and animal species and thus responsible for much of Earth's **biodiversity**. It is also critical to human health and survival by offering ecosystem services such as global temperature regulation, water purification, nutrient cycling, and pollination. The rainforest also provides humans with everyday products as well as with much of the oxygen we breathe.*

6. What consumer products are derived from the rainforest?

Coffee, nuts such as cashews, spices such as black pepper, cinnamon, nutmeg, vanilla, chocolate, medicine, and more.

7. If you played the game again, is there anything you would do differently? Why or why not?

Answers will vary.

8. What are possible economic benefits of preserving and sustainably managing rainforest lands?

Sometimes, there are monetary incentives to preserve land or tax breaks that apply to developers. A healthy rainforest might also provide valuable products or be a source of eco-tourism for people living in the area. Additionally, preserving land ensures that it will be available for generations to come.

assessment

Each student writes down one question based on information from any of the Risk or Choice Cards and includes the answer on the back. Next, they'll assign it a point value of either 100, 200, 300, 400, or 500. Collect all the questions and tape them to the board sorted by point value and general theme. Divide students into teams of five and proceed to a rapid fire game of Jeopardy.

follow-up activities

1. As a class, choose a specific rainforest and conduct an in-depth study of its health and the different commercial and environmental interests weighing in on that rainforest's use. The students could be divided into groups and assigned specific subtopics to research.
2. Students research and report on one of the specific areas discussed on the Choice or Risk Cards (for example, the effects of rainforest destruction on indigenous peoples).

¹National Geographic. *Deforestation Facts*. Retrieved from <https://www.nationalgeographic.com/environment/article/deforestation>

²Holzman, H.C. (2012, April 1). Accounting for Nature's Benefits: The Dollar Value of Ecosystem Services. *Environmental Health Perspectives*. doi: 10.1289/ehp.120-a152.

CHOICE CARD

You are the Minister of Agriculture for Cameroon. Your job is in jeopardy due to the lack of progress your country has made in dealing with the problem of feeding a growing population. You can:

decide to tear down rainforest land as a desperate measure to plant more crops for food (-1 environmental point, +250 wealth points)

or:

make a controversial political move and propose seeking assistance from industrial countries and thereby adding to the country's debt (-100 wealth points, +1 environmental point).

CHOICE CARD

You are aware of the increased energy needs created by a rapidly growing population. As a graduate of a prominent Brazilian engineering university, you have two job offers in the energy field. You can:

work with a start-up non-profit group, designing and building an experimental solar energy system located in the rainforest canopy (+2 environmental points, +100 wealth points)

or:

work on the operation and maintenance of a hydroelectric dam which generates large amounts of electricity, but also damages the surrounding rainforest (-1 environmental point, +350 wealth points).

CHOICE CARD

You run a small-scale mining operation in the Amazon region, bulldozing and dredging stream banks in search of gold ore. The Brazilian government has recently enacted new environmental regulations on mining practices in your region. In order to comply with these regulations your company would have to forfeit (lose) about one year's profit. You can:

obey the regulations and write your money off for tax deductions (+2 environmental points, -250 wealth points)

or:

use a favor you have with local officials to postpone an inspection of your operation, meanwhile setting up an illegal operation deeper in the forest and disregarding regulations (-3 environmental points, +250 wealth points).

CHOICE CARD

Giggley's Gum, Inc. has offered to double its order for chicle latex (used to make chewing gum) next year. However, your land is currently producing as much chicle latex as possible and you are unable to fill the order. You can:

tell Giggley's you are unable to provide that amount of product (+1 environmental point, -100 wealth points)

or:

remove surrounding rainforest to cultivate new plants and promise Giggley's you will fill the order within a year or two (-1 environmental point, +200 wealth points).

CHOICE CARD

Due to an increased number of espresso drinkers worldwide, demand for the coffee beans from your land has risen dramatically. You can:

meet the demand by over-planting and cutting down surrounding land. Although this process will destroy the land within five years, you will have made enough money to retire and to donate generously to environmental causes (-3 environmental points, +300 wealth points)

or:

maintain your production schedule (allowing your land to recover), and team up with a neighboring farmer to meet the rising demands (+2 environmental points, -100 wealth points).

CHOICE CARD

You are a manufacturer of rubber wetsuits in Los Angeles. You have two options for sources for the raw rubber. You can:

buy from small farmers, who extract the rubber sustainably, at a higher price (+1 environmental point, -100 wealth points)

or:

buy from large plantations that have cleared forest for their rubber crops (-1 environmental point, +150 wealth points).

CHOICE CARD

You live in North America and breed exotic birds. Much of the rainforest habitat of the bestselling bird species has been destroyed, due to increased demands on the forest caused by population pressures and irresponsible practices. The bird is in danger of becoming extinct. You can:

stop selling imported birds from the rainforest and instead create a bird sanctuary to raise awareness on vulnerable species and habitat loss (+1 environmental point, -200 wealth points)

or:

capitalize on their increasing rarity by importing and breeding the birds to sell for profit. You reason that this may be the best way to save the birds as their natural habitat disappears (-1 environmental point, +250 wealth points).

CHOICE CARD

You go to the grocery store for your weekly shopping. You see that many of the store brand products are cheaper, but you usually shop environmentally by paying attention to packaging and looking for products harvested sustainably from the tropical rainforests. You can:

purchase the store brand items to save some money (-1 environmental point, +50 wealth points)

or:

spend the extra money on the sustainable products and support the rainforest region (+1 environmental point, -50 wealth points).

CHOICE CARD

You own a small cashew plantation. The large American company Nifty Nuts, Inc. has decided not to renew your contract for cashew shipments. You can:

hold on to your land, forgo the money from this year's harvest, and hope for better luck next year (+1 environmental point, -150 wealth points)

or:

sell the land to a big cattle rancher who needs more grazing room (-1 environmental point, +150 wealth points).

CHOICE CARD

A new plant species has been discovered on land you own in the rainforest. Scientists believe the plant may have medicinal properties. You can:

sell the land to the government who intends to research this plant, although you cannot be assured this government will stay in power to conduct the necessary research (-1 environmental point, +150 wealth points)

or:

keep the land in its natural state and receive a small stipend from an international science group to conduct their own research (+1 environmental point, +50 wealth points).

CHOICE CARD

The government of the Democratic Republic of the Congo has offered you a contract to build a road into one of the rainforests to facilitate commercial game hunting. You can:

refuse the job, explaining that large scale commercial hunting leads to extinction and that the road construction will disturb the ecosystem (+2 environmental points, -300 wealth points)

or:

accept the job, reasoning that otherwise someone else will do it, and people need to eat (-2 environmental points, +300 wealth points).

CHOICE CARD

You work for the Brazilian government overseeing homologation – the final step in designating land as Indigenous property. Studies have shown that land owned by Indigenous tribes in the Amazon Rainforest saw a two-thirds reduction in the rate of deforestation over the past 40 years. You can:

choose to grant additional property rights back to Indigenous groups (+2 environmental points, -300 wealth points)

or:

refuse to designate any more of the Amazon Rainforest as Indigenous property and instead develop the area for economic gain (-1 environmental point, +150 wealth points).

CHOICE CARD

You are a young entrepreneur and have successfully opened a small furniture shop. A salesman comes into your shop with beautifully made mahogany desks, asking an unbelievably low price. You can:

refuse to purchase the items because mahogany comes from over-harvested trees in the rainforest and you boycott such products (+1 environmental point, -100 wealth points)

or:

purchase many of the desks to sell in your store. They are already made, you reason, so there's no saving those trees now anyway (-1 environmental point, +200 wealth points).

CHOICE CARD

As a National Geographic photographer assigned to capture the beauty of Indonesia's rainforest, you are determined to travel deep into the heart of the forest. When making travel plans you can:

take a plane operated by a large scale developing company, lasting about an hour (-1 environmental point, -100 wealth points)

or:

hire a local guide, buy provisions, and travel the distance by river and on foot, taking two extra weeks (+1 environmental point, -150 wealth points).

CHOICE CARD

You are the president of Sunny Drinks, Inc. Your company's product is not selling because it doesn't have enough tropical fruit flavor compared to the leading brand. You can:

use "incentives" to encourage the tropical fruit supplier to triple the output of its crops without having to purchase extra land (-2 environmental points, +250 wealth points)

or:

spend extra money on fruit which is sustainably harvested, giving your product an edge over your competitor (+1 environmental point, +150 wealth points).

CHOICE CARD

You are a cocoa supplier for Sweet Dreams, Inc. which is coming out with a new product called Choco-Caramel Delight. The company has strong indicators that this will be a smash so they want to increase production. You can:

increase land for planting cocoa by destroying an area of rainforest you had set aside for public use (-2 environmental points, +250 wealth points)

or:

continue to produce the same amount of cocoa and send Sweet Dreams elsewhere for the additional need (+1 environmental point, -50 wealth points).

CHOICE CARD

A world-famous Indian chef has realized there is a missing ingredient in one of her new specialties. All she needs is a spice that is found in a plant indigenous to the Madagascar rainforest. This plant is on your land, but has been preserved because it is food for a specific species of lemur. You can:

let your stomach do the talking and extract the spice from the plant at the expense of the lemur (-2 environmental points, +300 wealth points)

or:

tell the chef you're sorry, but you are committed to preserving this plant for the benefit of the lemurs (+2 environmental points, -300 wealth points).

CHOICE CARD

You have received a large sum of money from a film distributor for a documentary you made about the plight of the tropical rainforests. You can:

give the money back to the countries where you shot the film, by setting up conservation and service groups (+3 environmental points, -200 wealth points)

or:

keep the money for personal use (-1 environmental point, +200 wealth points).

CHOICE CARD

You have won the state lottery and decide to go on your dream vacation to the Malaysian rainforests. When making your travel arrangements you have two options. You can:

take advantage of a "budget deal" offered by your local travel agency, which charters an American plane and uses American guides (-1 environmental point, +150 wealth points)

or:

pay more for an "eco-tour" which emphasizes learning about the environment and ensures money goes to the local economy, decreasing pressure to cut down the forest for native people (+1 environmental point, -150 wealth points).

CHOICE CARD

You have recently acquired a large piece of rainforest that is located hillside and adjacent to a bustling town and home to several Sumatran tigers (of which fewer than 400 exist). You have no plans for the land until a developer comes along and offers you nearly double what you paid. Knowing that the forested area provides the town with protection against floods, fires, droughts, and other natural disasters as well as habitat for the Sumatran tigers you can:

take the deal and risk the forested area being clear-cut for development (-3 environmental points, +300 wealth points)

or:

put the forested area into a conservation easement to permanently ensure its protection and subsequently that of the townspeople and tigers (+3 environmental points, -300 wealth points).

CHOICE CARD

You run a water utility company and your lead water scientist comes to you voicing her concern with an upcoming development project. During the environmental impact assessment she found that a watershed located upland of the project (and subsequently all the people that depend on it for water) will be significantly impacted by development. You can:

take her expert advice and start looking for another site for the project (+2 environmental points, -300 wealth points)

or:

carry on with the project because you know that this site is the most profitable in the area (-3 environmental points, +300 wealth points).

CHOICE CARD

Your pizza shop is a neighborhood favorite and business is booming. One of your employees brings to your attention that the frozen dough you use contains palm oil. Palm oil plantations are rapidly replacing Indonesia's rainforests. You can:

change your pizza dough distributor, who you've been working with since you opened and gives you a big discount, to one that sells more expensive palm oil free pizza dough (+2 environmental points, -300 wealth points)

or:

reduce the amount of pizza dough you purchase which in turn reduces business (+1 environmental point, -200 wealth points).

CHOICE CARD

You're a scientist who has been hard at work on a new drug for months and finally have a breakthrough using bark from a rare tropical tree. The pharmaceutical company you work for is delighted and wants to acquire as much of the bark as possible. You can:

happily agree to make the trip yourself, after all you just got a promotion (-2 environmental points, +250 wealth points)

or:

continue your work and steer your efforts towards creating a synthetic form of the bark (+3 environmental points, -250 wealth points).

GO FOR THE GREEN | risk cards

RISK CARD

You are a subsistence farmer struggling to make a living off your plot of rainforest. A large cattle rancher is urging you to sell your land in order to tear down your plot for grazing. If you have 500 wealth points, you are able to resist (+1 environmental point). However if you have fewer than 500 wealth points, you are forced to sell out (-1 environmental point).

RISK CARD

A heavy rainfall floods your land and causes tremendous erosion because you were forced to live on marginal ground due to overpopulation. You lose 150 wealth points.

RISK CARD

A wealthy European perfume manufacturer is interested in extracting oils from some rainforest plants (bay oil, camphor oil, eucalyptus oil, patchouli oil, rosewood oil, sandalwood oil, and ylang-ylang). If you have 5 or more environmental points, you receive 100 wealth points from this company.

RISK CARD

A North American zoo would like to find a mate for their female macaw. They want to breed the species because it is considered endangered. If you have enough unlogged forest (5 environmental points or more), you can take advantage of the zoo's offer to pay 400 wealth points for a male macaw.

RISK CARD

Large amounts of curare are found on your segment of the rainforest. (Curare is used as a muscle relaxant for surgery.) A hospital chain from Europe gives you 150 wealth points for your supply.

RISK CARD

As a wealthy alumnus of your university, you are approached by a group of students trying to start a conservation biology program. If you want to support their efforts, you may trade 150 wealth points for 2 environmental points.

RISK CARD

A huge forest fire is raging throughout Indonesia's East Kalimantan. If you have virgin/unlogged forest (5 environmental points or more), you are okay. If you have logged forest (less than 5 environmental points), you lose it all (-300 wealth points).

RISK CARD

A landowner is offering to sell a large tract of rainforest to someone willing to commit to preserving the land. You may trade 150 wealth points for 2 environmental points, if you want to do this.

RISK CARD

Due to improper maintenance, a fuel storage tank for logging equipment leaks toxic substances into the water supply. You lose 2 environmental points unless you have 500 wealth points to take care of the problem before significant damage is done.

RISK CARD

An International Climate Coalition is offering financial assistance to those who have demonstrated dedication to preserving the rainforests. If you have 5 or more environmental points, you get 200 wealth points.

RISK CARD

You are throwing a large party and want to serve some ecologically sound food, however you have financial concerns to consider. If you have 400 or more wealth points, you can have a "rainforest caterer" deliver nuts, dried fruits, palm hearts, etc. (+1 environmental point). Or, if you have under 400 wealth points, you must forgo the environmental snacks and buy pretzels.

RISK CARD

This is your lucky day! On your way to an important conference on saving the rainforest, you are seated next to a famous rock star on the plane. You convince her not only to attend the conference, but to promote your cause on her next album (+2 environmental points).

RISK CARD

Congratulations! Your proposed “debt for nature” trade between a U.S. bank and the government of Democratic Republic of the Congo was adopted (+1 environmental point).

RISK CARD

You have developed a series of rainforest preservation T-shirts which have become a huge success thanks to Instagram (+1 environmental point, +100 wealth points).

RISK CARD

Your deforestation practices in the Himalayan mountains helped contribute to the 12 million acres of damaged land in India (-1 environmental point).

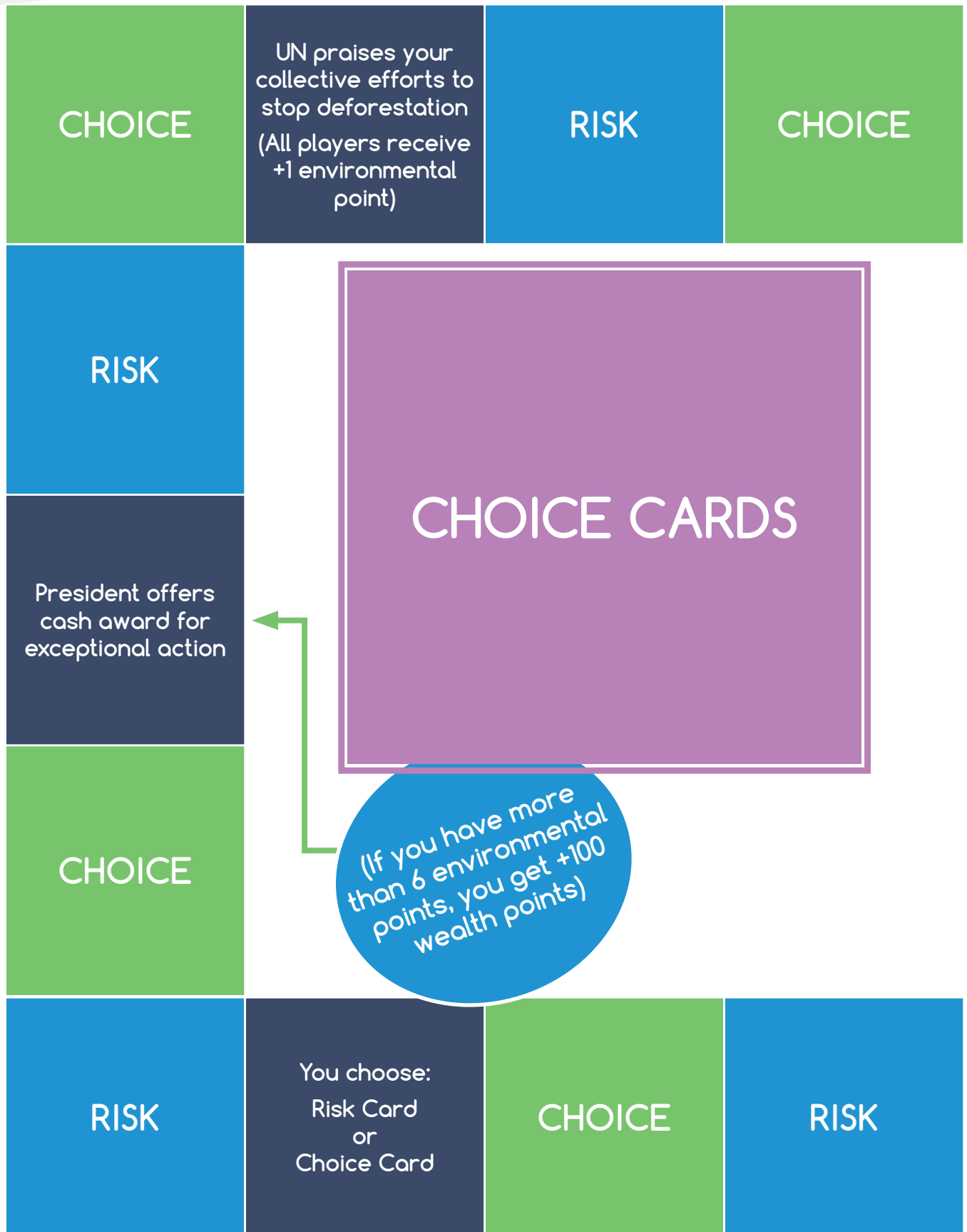
RISK CARD

Your new line of “rainforest cosmetics” is a big hit. Not only is it selling well (+100 wealth points), but it is raising awareness of rainforest destruction and promoting sustainable harvesting (+1 environmental point).

RISK CARD

You have clear-cut the rainforest to provide pastures for your cattle. However, within a year, the land is invaded by toxic weeds which kill your entire herd (-1 environmental point, -100 wealth points).

GO FOR THE GREEN | game board



CHOICE

Heavy rains and soil erosion cause a destructive mud slide (-75 wealth points)

RISK

Time Magazine prints your article on rainforest destruction (+1 environmental point)

RISK CARDS

CHOICE

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RISK

International holiday - no activity (Miss a turn)

RISK

Record nut harvest (+100 wealth points)

CHOICE

RISK