

THE WATER SECURITY GAME – CAMBODIA

Each player, which may be an individual or team, represents a small community in rural Cambodia. Players must make decisions on water and land uses that balance community well-being and watershed environmental sustainability. These decisions determine overall resilience as well as the gains and losses of income (cash tokens) and water resources (water tokens). The player with the most cash and water tokens after four rounds wins the game.

KEY CONCEPTS



CASH TOKENS

Represent money.



WATER TOKENS

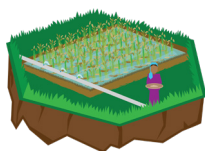
Represent water security.

LAND USE CARDS

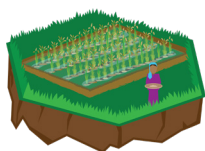
Represent seven land uses, with unique impacts on cash and water tokens.



AGRICULTURE
RAINFED



AGRICULTURE
COMMERCIALY
IRRIGATED



CLIMATE
SMART
AGRICULTURE



AGROFORESTRY



PROTECTED
FOREST



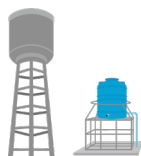
IRRIGATED
TREE
PLANTATION

WATER SECURITY ACTIVITY CARDS

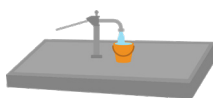
Represent five water security activities, with unique impacts on cash tokens, water tokens, and resilience points (for flood, drought, and water-borne disease).



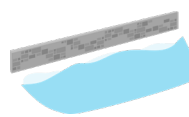
SANITATION



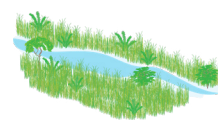
WATER
STORAGE



COMMUNITY
WATER POINT



FLOOD
PROTECTION



GREEN
INFRASTRUCTURE

DISASTER DICE

Determines which disaster (flood, drought, or water-borne disease) affects players.



WATER-BORNE
DISEASE



DROUGHT



FLOOD

COMMUNITY CHANCE CARDS

Represent environmental, political, social, or other events with unique impacts on cash and water tokens.

WATERSHED CHANCE CARDS

Represent environmental, political, social, or other events that have positive or negative impacts on cash and water tokens, exchanged between players.

RIVER BASIN CARDS

Represent each player's downstream or upstream location.

INSTRUCTIONS

- River basin card:** Players draw river basin cards to determine who is “upstream” or “downstream,” which remains constant throughout the game.
- Initial cash token distribution:** In Round 1, moderator(s) distribute 10 cash tokens to each player. After Round 1, players start with the cash tokens held at the end of the previous round.
- Water budget:** Moderator(s) distribute water tokens to each player, representing water from rivers, rain, groundwater, or other sources. The number of tokens distributed each round decreases to represent potential impacts of climate change and declining water availability:



- Land uses:** In Round 1, all players start with an assigned set of four Land Use cards, which the moderator(s) distributes. After Round 1, players may purchase land uses using their cash tokens to replace current ones.
- Land use earnings and deductions:** Based on each player’s selected land uses, the moderator(s) hand out cash tokens generated and water tokens either generated or required by land uses.
- Community livelihood costs:** Players must pay community livelihood costs in cash tokens to the moderator(s) to cover basic costs (education, food, health, etc.) each round. These costs increase each round to represent increasing demand and population growth:



- Community water needs:** The moderator(s) collect water tokens for community water needs to cover basic water needs (drinking, sanitation, cooking, etc.). These needs increase each round to represent increasing demand and population growth:



- Water security activities:** Players choose whether to invest in water security activities to avoid potential disaster impacts (see below). Moderator(s) collect cash tokens for the cost of any purchased water security activities and distribute water tokens gained from existing water security activities.
- Disaster:** Each round, the moderator rolls the disaster dice to determine which disaster will impact players. Players can avoid the disaster impacts with accrued resilience points from their water security activity cards. Resilience points needed to avoid disasters increase each round to represent the growing impacts of climate change, as do negative impacts on water and cash tokens.

	ROUND 1	ROUND 2	ROUND 3	ROUND 4
Resilience points to avoid each disaster (water-borne disease, drought, or flood)	+3	+4	+5	+6
Negative impact on both water and cash tokens if resilience points not met	-3	-4	-5	-6

- Community chance cards:** Each player draws a community chance card. Moderator(s) collect or distribute tokens accordingly.
- Watershed chance card:** Moderator(s) draw one watershed chance card which applies to all players. Player(s) exchange tokens accordingly, based on their upstream or downstream position.
- Balancing water and cash:** Water and cash tokens are balanced at the end of each round. For every “negative” water or cash token (e.g. a player could not pay water needs, livelihood costs, or chance cards), two cash or water tokens must be paid respectively. The moderator(s) collect tokens accordingly. If a player does not have enough tokens to pay to meet the minimum allowable amounts of 0 water and 0 cash tokens, they may not proceed to the next round.
- Round summary:** The moderator(s) note water and cash token totals. Players carry land uses, water security activities, and income over to following rounds but must put water tokens aside.
- Number of rounds:** Play for 4 rounds total. Repeat steps 2-12.
- End of game.** The moderator(s) debriefs players on round outcomes and discusses impact of land use choices, chance cards, and disasters. The moderator(s) facilitate a discussion about how the game was ‘won and lost’ and how the game applies to communities.



LAND USE 1

LAND USE 2

LAND USE 3

LAND USE 4

RIVER

RIVER BASIN CARD

UPSTREAM

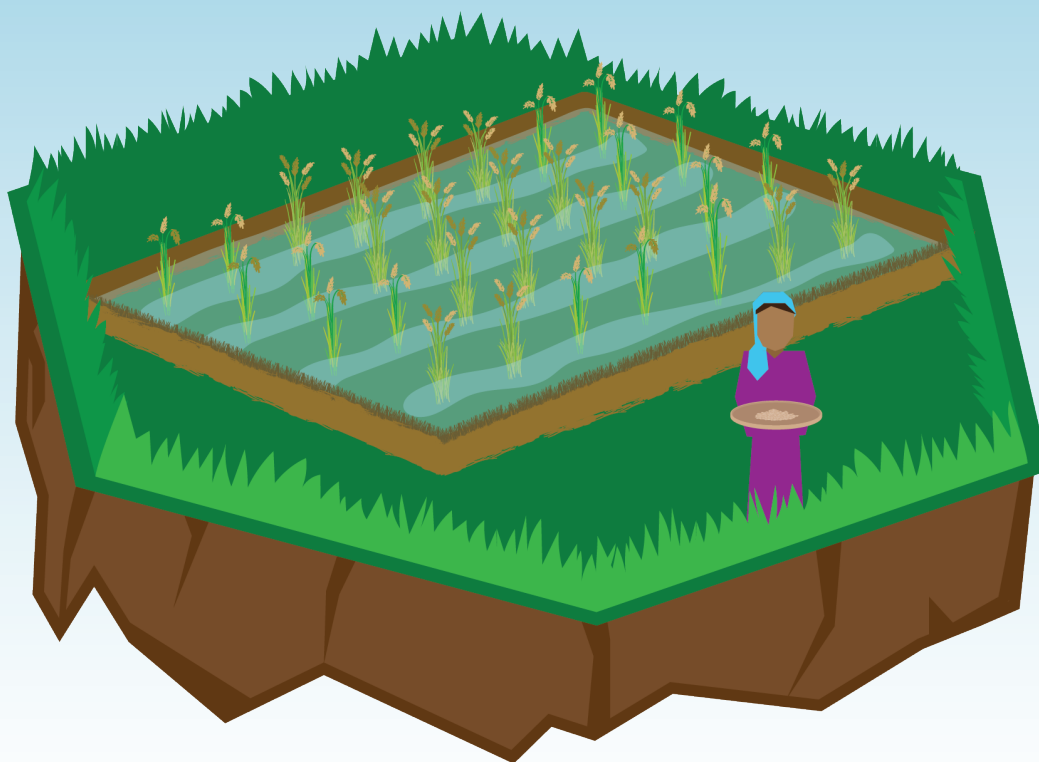
RIVER BASIN CARD

DOWNSTREAM

RIVER BASIN CARD

DOWNSTREAM

AGRICULTURE RAINFED



CASH TOKENS

ONE-TIME
COST



*to switch to
this land use*

ANNUAL
CASH GAIN



*generated by
this land use*

WATER TOKENS

IMPACTS FAR
FROM RIVER



IMPACTS CLOSE
TO RIVER

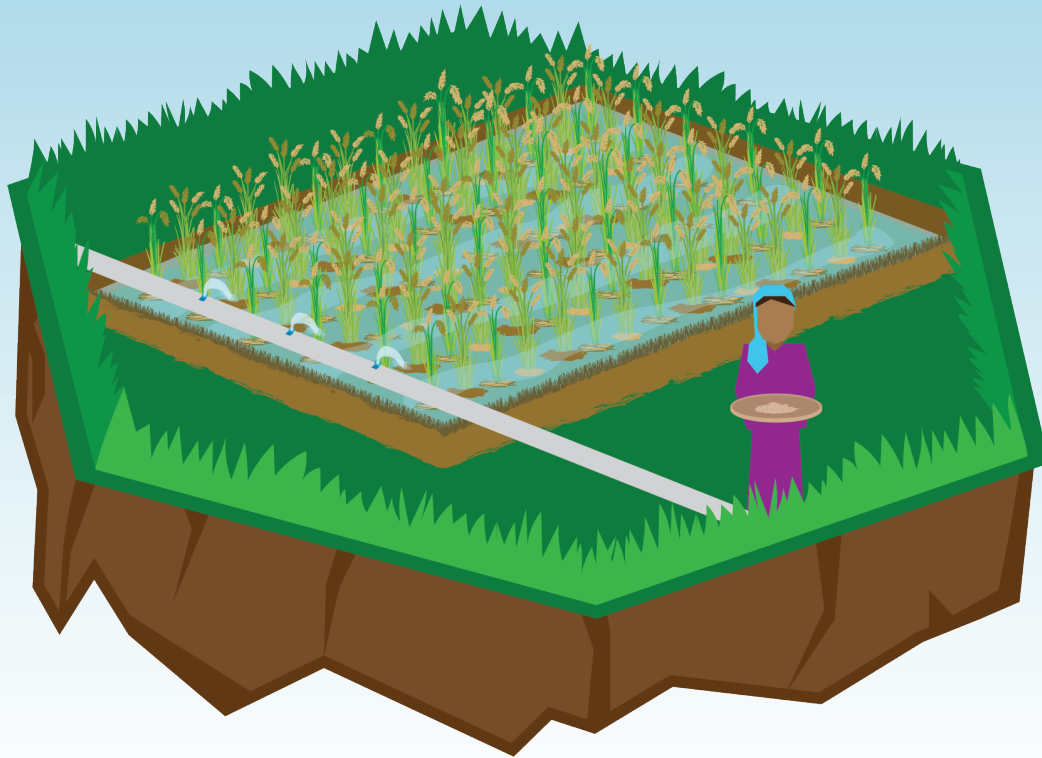


USAID
FROM THE AMERICAN PEOPLE



WINROCK
INTERNATIONAL

AGRICULTURE COMMERCIALLY IRRIGATED



CASH TOKENS

ONE-TIME
COST



*to switch to
this land use*

ANNUAL
CASH GAIN



*generated by
this land use*

WATER TOKENS

IMPACTS FAR
FROM RIVER



IMPACTS CLOSE
TO RIVER



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CLIMATE SMART AGRICULTURE



CASH TOKENS

ONE-TIME
COST



*to switch to
this land use*

ANNUAL
CASH GAIN



*generated by
this land use*

WATER TOKENS

IMPACTS FAR
FROM RIVER



IMPACTS CLOSE
TO RIVER



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AGROFORESTRY



CASH TOKENS

ONE-TIME
COST



*to switch to
this land use*

ANNUAL
CASH GAIN



*generated by
this land use*

WATER TOKENS

IMPACTS FAR
FROM RIVER



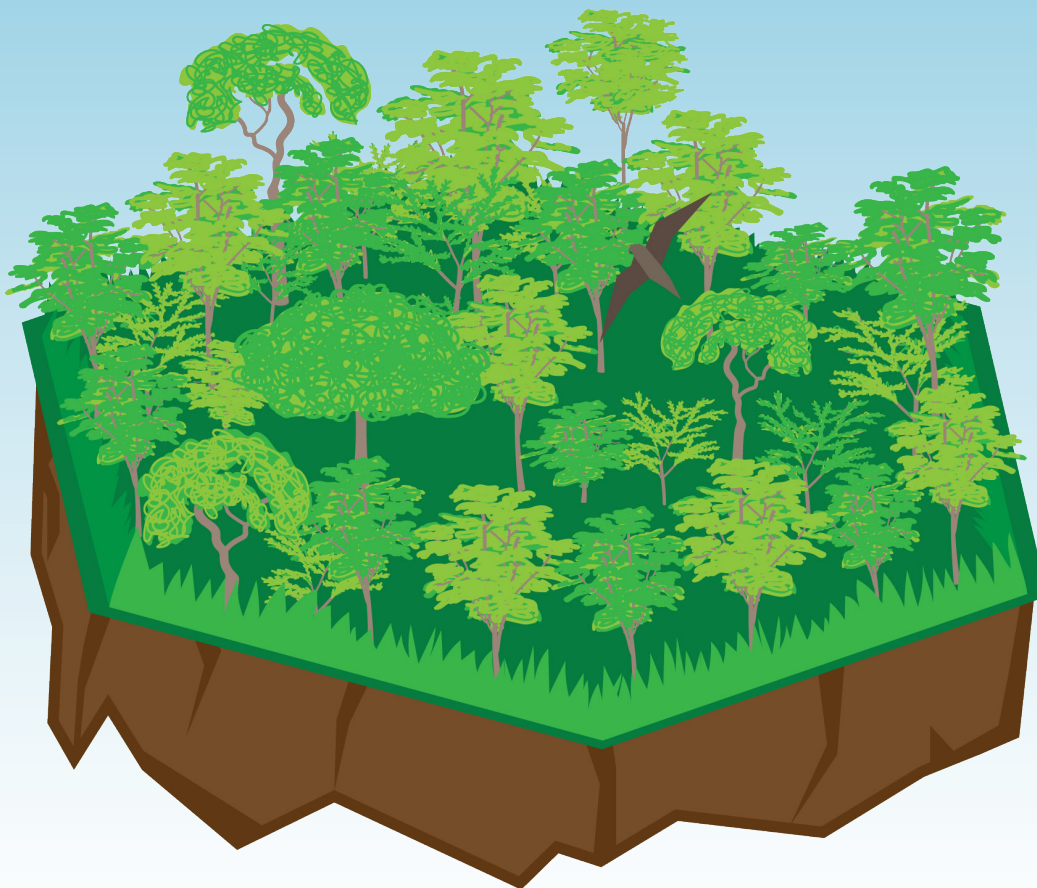
IMPACTS CLOSE
TO RIVER



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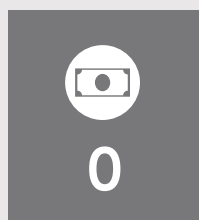


PROTECTED FOREST



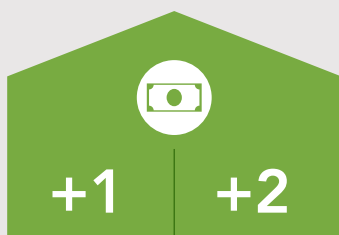
CASH TOKENS

ONE-TIME
COST



to switch to
this land use

ANNUAL
CASH GAIN

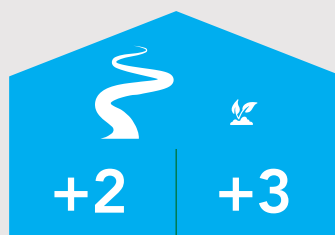


round of
purchase

subsequent
rounds

WATER TOKENS

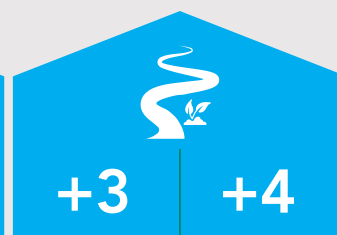
IMPACTS FAR
FROM RIVER



round of
purchase

subsequent
rounds

IMPACTS CLOSE
TO RIVER



round of
purchase

subsequent
rounds



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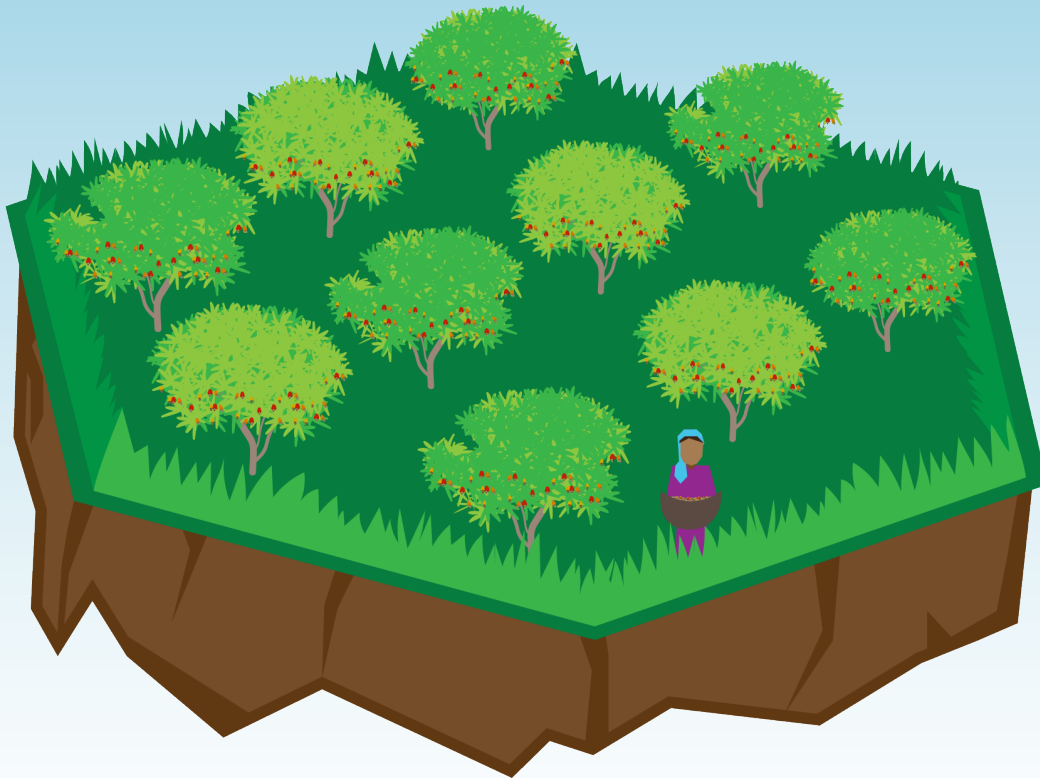


SUSTAINABLE WATER PARTNERSHIP



WINROCK
INTERNATIONAL

IRRIGATED TREE PLANTATION



CASH TOKENS

ONE-TIME
COST



to switch to
this land use

ANNUAL
CASH GAIN



round of
purchase

subsequent
rounds

WATER TOKENS

IMPACTS FAR
FROM RIVER



round of
purchase

subsequent
rounds

IMPACTS CLOSE
TO RIVER



round of
purchase

subsequent
rounds

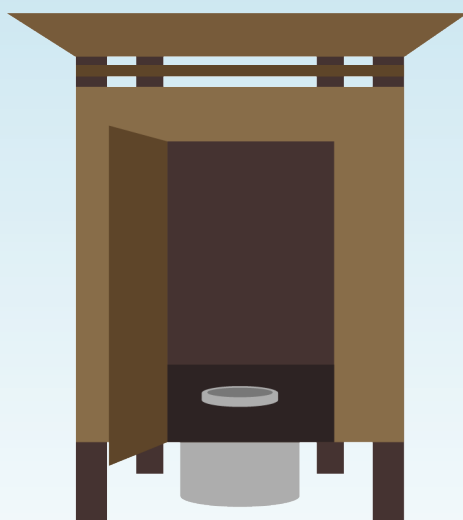


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SANITATION

[e.g. latrines, improved treatment]



CASH TOKENS



capital cost

WATER TOKENS



benefit

RESILIENCE POINTS



Disease: 3



Drought: 1



Flood: 2

Number of infrastructure type available for purchase: **Unlimited**



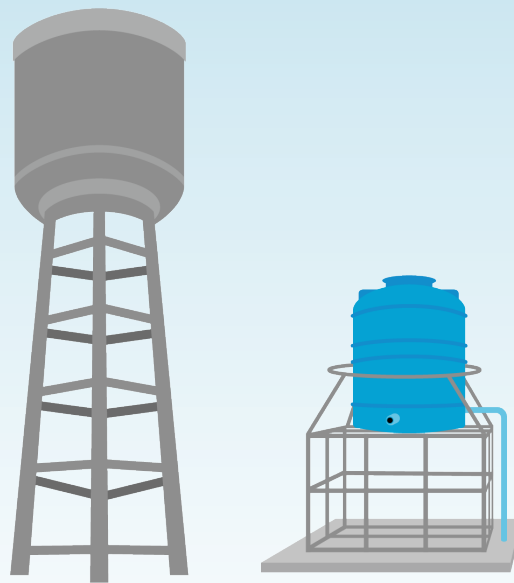
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INTERNATIONAL

WATER STORAGE

[e.g. trough, rain barrels, ponds, reservoirs]



CASH TOKENS



capital cost

WATER TOKENS



benefit

RESILIENCE POINTS



Disease: 2



Drought: 3



Flood: 1

Number of infrastructure type available for purchase: **Unlimited**

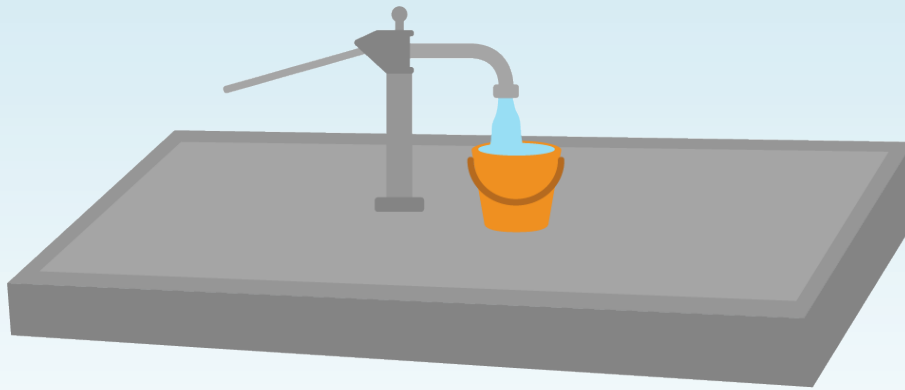


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COMMUNITY WATER POINT

[surface water intake, groundwater wells]



CASH TOKENS



capital cost

WATER TOKENS



benefit

RESILIENCE POINTS



Disease: 2



Drought: 3



Flood: 1

Number of infrastructure type available for purchase: **1 per round, max of 3**

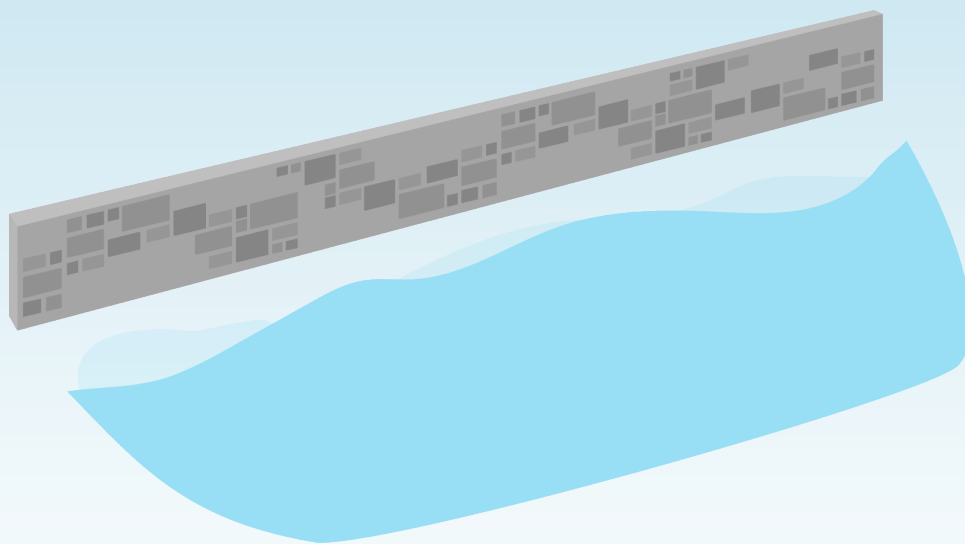


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FLOOD PROTECTION

[drainage, berms, flood walls]



CASH TOKENS



capital cost

WATER TOKENS



benefit

RESILIENCE POINTS



Disease: 2



Drought: 1



Flood: 3

Number of infrastructure type available for purchase: **1 per round**



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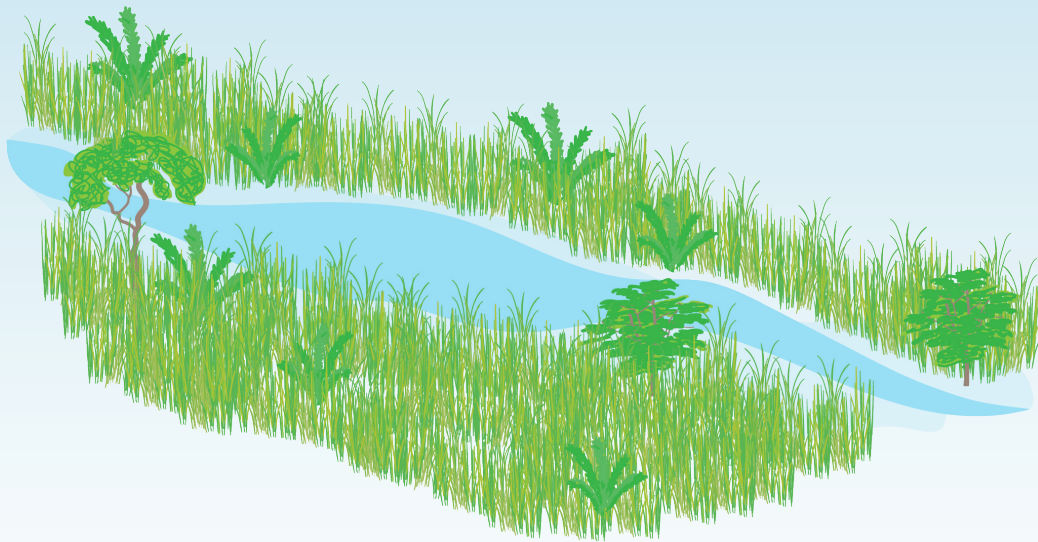
SUSTAINABLE WATER PARTNERSHIP



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INTERNATIONAL

GREEN INFRASTRUCTURE

[vegetative cover for source water protection, natural buffers, grassed waterways, stream and coastal buffers]



CASH TOKENS



capital cost

WATER TOKENS



benefit

RESILIENCE POINTS



Disease: 1



Drought: 2



Flood: 3

Number of infrastructure type available for purchase: **Unlimited**



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COMMUNITY CHANCE

The prime minister orders that only one rice cycle can be grown per year due to drought, but neighbors do not listen and grow two cycles, leading to reduced water availability. - 3 water if your neighbor to your right has any irrigated land uses.



COMMUNITY CHANCE

Your community received a loan to build water storage, leading to less water stress during the dry season, improved health, and more water availability, gain 1 water storage infrastructure with benefits the next round.



COMMUNITY CHANCE

Overuse of fertilizers has led increased runoff and contamination of your river water, -3 water unless you have green infrastructure, which offers source water protection and limits damage to -1 water.



COMMUNITY CHANCE

The cost of fertilizer has increased: -1 cash for each land use plot except climate smart agriculture and forests.



COMMUNITY CHANCE

Brown planthopper swarms occur and everyone in your community loses their crop, -3 cash, -2 water.



COMMUNITY CHANCE

Ecotourism operators are drawn to your community due to protected forests. +3 cash if you have any forest land use cards.



COMMUNITY CHANCE

Your community has invested in stream buffers to prevent agrochemicals leaching into canals and streams. As a result, waterways have more fish, riverbanks are sturdier, and it is safe to fish. This increases livelihoods and discourages livestock from approaching the river, +3 cash and +2 water.



COMMUNITY CHANCE

In a bumper year for cashew nuts, prices have increased. If you have a tree plantation, +4 cash.



COMMUNITY CHANCE

This year, there is increased competition for water between communities in the region, negatively impacting economic growth and reducing water availability, unless you have a community water point or water storage, -3 cash, -2 water.



COMMUNITY CHANCE

There is a watershed-wide behavior change communications campaign to promote safe sanitation and good water management practices. As a result, more people begin adopting better WASH practices, +2 water.



COMMUNITY CHANCE

A global pandemic reduces export demand, reduces migration of agricultural workers able to help with cultivation, and hurts local economies, -4 cash for impacts on livelihoods.



COMMUNITY CHANCE

You have invested in better agricultural equipment, including improved irrigation, cultivation, and storage equipment to increase yields and minimize rice losses, +3 cash, +2 water if you have any agricultural plot.



COMMUNITY CHANCE

A fish farm is established on your land, increasing your income but impacting nearby water quality, +3 cash, and -1 water.



COMMUNITY CHANCE

A local well tested positive for unsafe levels of arsenic, posing threats to human health and therefore making the drinking water unusable. Safe local water availability decreases, -3 water.



COMMUNITY CHANCE

Due to imminent threats of changing weather patterns, if you have any rainfed agriculture you are under higher risk of both severe droughts and floods and therefore have greater chances of losing your crop, -2 water, -2 cash.



COMMUNITY CHANCE

A country REDD+ strategy is implemented, rewarding avoided deforestation and degradation in local communities with funding from international sources. If you have any protected forested land uses +3 cash, or if you have no protected forests, but have any plantation land use, +2 cash.



WATERSHED CHANCE

Payment for Environmental Services is introduced in the watershed by the Ministry of the Environment, improving coordination between upstream and downstream communities.

If the upstream player has any forests, each downstream player pays the upstream player 1 cash, and the upstream player gives 1 water to each downstream player.



WATERSHED CHANCE

A major irrigation project is implemented in upstream communities, leading to water abstraction and less river flow downstream. If the upstream player has any irrigated agriculture or tree plantation land use cards, each downstream player must give the upstream player 2 water.



WATERSHED CHANCE

Discussions between upstream and downstream communities mitigate water rights disputes and lead to more equitable water distribution. The upstream player gives downstream players 1 water each.



WATERSHED CHANCE

An Economic Land Concession (ELC) is granted to an upstream community to develop industrial agriculture on previously forested land, increasing water pollution and abstraction. Unless the downstream player has green infrastructure, they must each give 2 water to each upstream player.



WATERSHED CHANCE

A large hotel is built upstream, increasing abstraction of surface water and inputs of waste flowing to downstream communities. The upstream player takes 1 water from each downstream player unless the downstream player has a community water point.



WATERSHED CHANCE

Upstream communities have invested in more agroforestry and forested land near the water spring source, leading to reduced erosion and improved water quality in exchange for payment from downstream communities. Each downstream player must pay upstream communities 2 cash each and the upstream player must give +1 water to each downstream player.



WATERSHED CHANCE

Due to deforestation and pollution upstream, ecotourism to areas upstream decreases and moves towards communities downstream. The upstream player must give 2 cash to each downstream player.



WATERSHED CHANCE

A dam is constructed upstream of the watershed, resulting in overexploitation and reduced water resources downstream. Unless they have a community water point, each downstream player must give the upstream player 2 water.



WATERSHED CHANCE

Over-extraction of water upstream leads to conflict between upstream and downstream communities, with protests in the area shutting off roads key for value chains. The upstream player must give 1 cash to each downstream player.



Water Tokens

please cut along dotted lines



Money Tokens

please cut along dotted lines



AGRICULTURE RAINFED



CASH TOKENS

ONE-TIME
COST



to switch to
this land use

ANNUAL
CASH GAIN



generated by
this land use

WATER TOKENS

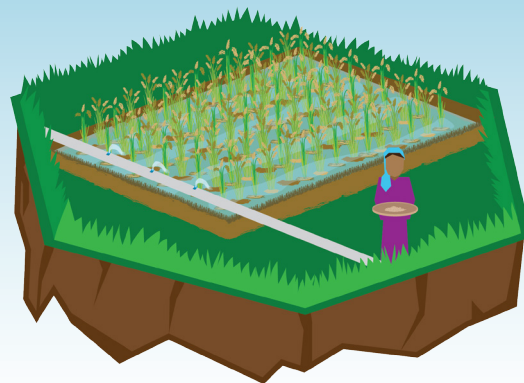
IMPACTS FAR
FROM RIVER



IMPACTS CLOSE
TO RIVER



AGRICULTURE COMMERCIALY IRRIGATED



CASH TOKENS

ONE-TIME
COST



to switch to
this land use

ANNUAL
CASH GAIN



generated by
this land use

WATER TOKENS

IMPACTS FAR
FROM RIVER



IMPACTS CLOSE
TO RIVER



CLIMATE SMART AGRICULTURE



CASH TOKENS

ONE-TIME
COST



to switch to
this land use

ANNUAL
CASH GAIN



generated by
this land use

WATER TOKENS

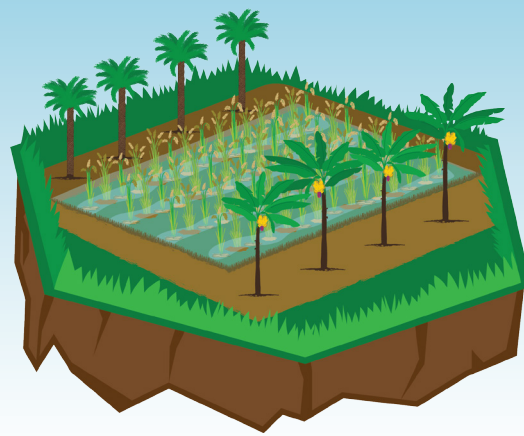
IMPACTS FAR
FROM RIVER



IMPACTS CLOSE
TO RIVER



AGROFORESTRY



CASH TOKENS

ONE-TIME
COST



to switch to
this land use

ANNUAL
CASH GAIN



generated by
this land use

WATER TOKENS

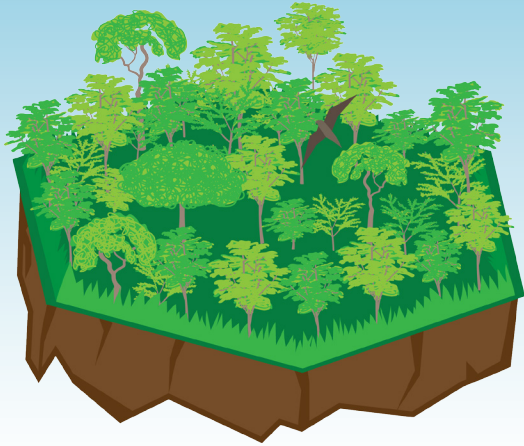
IMPACTS FAR
FROM RIVER



IMPACTS CLOSE
TO RIVER



PROTECTED FOREST



CASH TOKENS

ONE-TIME COST



to switch to this land use

ANNUAL CASH GAIN



round of purchase

+2

subsequent rounds

WATER TOKENS

IMPACTS FAR FROM RIVER



round of purchase

+3

subsequent rounds

IMPACTS CLOSE TO RIVER

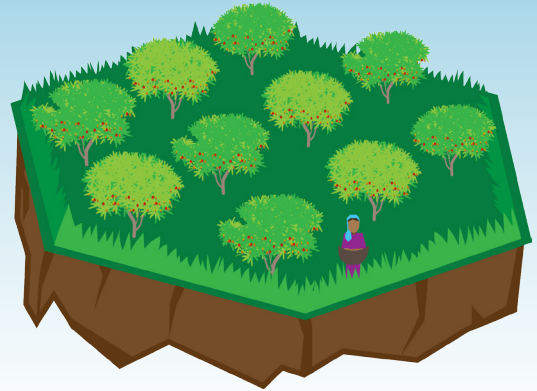


round of purchase

+4

subsequent rounds

IRRIGATED TREE PLANTATION



CASH TOKENS

ONE-TIME COST



to switch to this land use

ANNUAL CASH GAIN



round of purchase

+6

subsequent rounds

WATER TOKENS

IMPACTS FAR FROM RIVER



round of purchase

-3

subsequent rounds

IMPACTS CLOSE TO RIVER



round of purchase

-4

subsequent rounds