import React, { useState } from "react";

import {

Chart as ChartJS,

CategoryScale,

LinearScale,

BarElement,

Title,

Tooltip,

Legend,

} from "chart.js";

import { Bar } from "react-chartjs-2";

// Register Chart.js components

ChartJS.register(CategoryScale, LinearScale, BarElement, Title, Tooltip, Legend);

// Define crop data

const crops = [

{ name: "Sallat", openFieldYield: 40, shadowLoss: 0.2, lleafBoost: 0.15, pricePerTon: 9000, waterSavedPercent: 0.18, co2PerTon: 1.2 },

{ name: "Tomat", openFieldYield: 70, shadowLoss: 0.25, lleafBoost: 0.15, pricePerTon: 8000, waterSavedPercent: 0.22, co2PerTon: 1.5 },

{ name: "Spenat", openFieldYield: 50, shadowLoss: 0.15, lleafBoost: 0.12, pricePerTon: 7000, waterSavedPercent: 0.14, co2PerTon: 1.1 },

{ name: "Gurka", openFieldYield: 60, shadowLoss: 0.25, lleafBoost: 0.18, pricePerTon: 8500, waterSavedPercent: 0.2, co2PerTon: 1.3 },

];

export default function App() {

// State variables for selected crop and input parameters

const [selectedCrop, setSelectedCrop] = useState(crops[0]);

const [panelCoverage, setPanelCoverage] = useState(50);

const [methanolPricePerTon, setMethanolPricePerTon] = useState(6000);

const [methanolYieldPerHa, setMethanolYieldPerHa] = useState(1200); // Updated default value as requested

// New state variables for CCU

const [ccuPricePerTon, setCcuPricePerTon] = useState(800); // Default price based on EU ETS (approx. 800 SEK/ton)

const [ccuCo2CapturedPerHa, setCcuCo2CapturedPerHa] = useState(99.8); // Updated default CO2 captured per hectare as per user's request

// Calculate shaded and unshaded areas

const shaded = panelCoverage / 100;

const unshaded = 1 - shaded;

// Get shadow loss and LLEAF boost from selected crop

const loss = selectedCrop.shadowLoss;

const boost = selectedCrop.lleafBoost;

// Calculate effective yield with Agri-PV and LLEAF

const effectiveYield = () => selectedCrop.openFieldYield \* unshaded + selectedCrop.openFieldYield \* shaded \* (1 - loss + boost);

// Calculate yield difference compared to open field

const yieldDifference = () => ((effectiveYield() - selectedCrop.openFieldYield) / selectedCrop.openFieldYield) \* 100;

// Calculate crop revenue

const revenue = () => effectiveYield() \* selectedCrop.pricePerTon;

// Calculate water saving percentage

const waterSaving = () => selectedCrop.waterSavedPercent \* shaded;

// Calculate CO2 saving from crop

const co2Saving = () => effectiveYield() \* selectedCrop.co2PerTon;

// Calculate methanol revenue

const methanolRevenue = () => methanolYieldPerHa \* methanolPricePerTon;

// Calculate CO2 captured specifically for methanol production (approx. 1.375 tons CO2 per ton methanol)

const co2CapturedForMethanol = methanolYieldPerHa \* 1.375;

// Calculate total CCU revenue, including CO2 captured for methanol

const ccuRevenue = () => ccuPricePerTon \* (ccuCo2CapturedPerHa + co2CapturedForMethanol);

// Data for the bar chart

const chartData = {

labels: ["Grödaintäkt", "Metanolintäkt", "CCU-intäkt"],

datasets: [

{

label: "SEK/ha/år",

data: [revenue(), methanolRevenue(), ccuRevenue()],

backgroundColor: ["#4bc0c0", "#9966ff", "#ffcd56"], // Colors for the bars, added one for CCU

borderRadius: 8, // Rounded corners for bars

},

],

};

// Options for the bar chart

const chartOptions = {

responsive: true,

plugins: {

legend: { position: "top" }, // Position of the legend

title: { display: true, text: "Intäkter per hektar och år" }, // Chart title

},

scales: {

x: {

title: { display: true, text: "Inkomstkälla" }, // X-axis title

grid: { display: false }, // Hide x-axis grid lines

},

y: {

beginAtZero: true, // Start y-axis from zero

title: { display: true, text: "SEK" }, // Y-axis title

grid: { color: "#e0e0e0" }, // Light gray grid lines

},

},

};

return (

<div className="min-h-screen bg-gray-100 flex items-center justify-center p-4 sm:p-6 lg:p-8">

<div className="bg-white shadow-lg rounded-xl p-6 sm:p-8 lg:p-10 w-full max-w-4xl">

<h1 className="text-2xl sm:text-3xl font-extrabold text-gray-800 mb-6 text-center">

Agri-PV Skörde- & Energi-analys med LLEAF

</h1>

<div className="grid grid-cols-1 md:grid-cols-2 gap-6 mb-8">

{/\* Crop selection \*/}

<div>

<label htmlFor="crop-select" className="block text-gray-700 text-sm font-semibold mb-2">

Välj gröda

</label>

<select

id="crop-select"

value={selectedCrop.name}

onChange={(e) => setSelectedCrop(crops.find((c) => c.name === e.target.value))}

className="w-full p-3 border border-gray-300 rounded-lg focus:ring-2 focus:ring-blue-500 focus:border-blue-500 transition duration-200 ease-in-out"

>

{crops.map((crop) => (

<option key={crop.name} value={crop.name}>{crop.name}</option>

))}

</select>

</div>

{/\* Panel Coverage input \*/}

<div>

<label htmlFor="panel-coverage" className="block text-gray-700 text-sm font-semibold mb-2">

Paneltäckning (% av marken)

</label>

<input

type="number"

id="panel-coverage"

value={panelCoverage}

min={0}

max={100}

onChange={(e) => setPanelCoverage(Number(e.target.value))}

className="w-full p-3 border border-gray-300 rounded-lg focus:ring-2 focus:ring-blue-500 focus:border-blue-500 transition duration-200 ease-in-out"

/>

</div>

{/\* Methanol Price input \*/}

<div>

<label htmlFor="methanol-price" className="block text-gray-700 text-sm font-semibold mb-2">

Metanolpris (SEK/ton)

</label>

<input

type="number"

id="methanol-price"

value={methanolPricePerTon}

onChange={(e) => setMethanolPricePerTon(Number(e.target.value))}

className="w-full p-3 border border-gray-300 rounded-lg focus:ring-2 focus:ring-blue-500 focus:border-blue-500 transition duration-200 ease-in-out"

/>

</div>

{/\* Methanol Yield input \*/}

<div>

<label htmlFor="methanol-yield" className="block text-gray-700 text-sm font-semibold mb-2">

Metanolproduktion (ton/ha/år)

</label>

<input

type="number"

id="methanol-yield"

value={methanolYieldPerHa}

step={0.1}

onChange={(e) => setMethanolYieldPerHa(Number(e.target.value))}

className="w-full p-3 border border-gray-300 rounded-lg focus:ring-2 focus:ring-blue-500 focus:border-blue-500 transition duration-200 ease-in-out"

/>

</div>

{/\* CCU Price input \*/}

<div>

<label htmlFor="ccu-price" className="block text-gray-700 text-sm font-semibold mb-2">

Intäkt per ton CO₂ för CCU-rättigheter (SEK/ton)

</label>

<input

type="number"

id="ccu-price"

value={ccuPricePerTon}

onChange={(e) => setCcuPricePerTon(Number(e.target.value))}

className="w-full p-3 border border-gray-300 rounded-lg focus:ring-2 focus:ring-blue-500 focus:border-blue-500 transition duration-200 ease-in-out"

/>

</div>

{/\* CCU CO2 Captured input \*/}

<div>

<label htmlFor="ccu-co2-captured" className="block text-gray-700 text-sm font-semibold mb-2">

Fångad CO₂ per hektar (annan CCU) (ton/ha/år)

</label>

<input

type="number"

id="ccu-co2-captured"

value={ccuCo2CapturedPerHa}

step={0.1}

onChange={(e) => setCcuCo2CapturedPerHa(Number(e.target.value))}

className="w-full p-3 border border-gray-300 rounded-lg focus:ring-2 focus:ring-blue-500 focus:border-blue-500 transition duration-200 ease-in-out"

/>

</div>

</div>

{/\* Results section \*/}

<div className="bg-blue-50 p-6 rounded-xl shadow-inner mb-8">

<h2 className="text-xl sm:text-2xl font-bold text-blue-800 mb-4">Resultat</h2>

<div className="grid grid-cols-1 sm:grid-cols-2 gap-4 text-gray-800">

<p>

<strong className="font-semibold">Referensskörd (öppet fält):</strong>{" "}

{selectedCrop.openFieldYield} ton/ha/år

</p>

<p>

<strong className="font-semibold">Beräknad skörd (Agri-PV + LLEAF):</strong>{" "}

{effectiveYield().toFixed(1)} ton/ha/år

</p>

<p>

<strong className="font-semibold">Förändring mot öppet fält:</strong>{" "}

<span className={yieldDifference() >= 0 ? "text-green-600" : "text-red-600"}>

{yieldDifference().toFixed(1)}%

</span>

</p>

<p>

<strong className="font-semibold">Grödaintäkt:</strong>{" "}

{revenue().toLocaleString()} SEK/ha/år

</p>

<p>

<strong className="font-semibold">Vattenbesparing:</strong>{" "}

{(waterSaving() \* 100).toFixed(1)}%

</p>

<p>

<strong className="font-semibold">CO₂-besparing från gröda:</strong>{" "}

{co2Saving().toFixed(1)} ton CO₂/ha/år

</p>

<hr className="my-6 border-gray-300 col-span-full" /> {/\* Full width HR \*/}

<p>

<strong className="font-semibold">Metanolintäkt (Sunthetics):</strong>{" "}

{methanolRevenue().toLocaleString()} SEK/ha/år

</p>

<p>

<strong className="font-semibold">CO₂-infångning (för Metanol):</strong>{" "}

{co2CapturedForMethanol.toFixed(1)} ton CO₂/ha/år

</p>

<p>

<strong className="font-semibold">Intäkt från CCU-rättigheter:</strong>{" "}

{ccuRevenue().toLocaleString()} SEK/ha/år

</p>

<p className="text-lg font-bold text-purple-700 col-span-full"> {/\* Full width for total \*/}

<strong className="font-semibold">Total intäkt (Gröda + Metanol + CCU):</strong>{" "}

{(revenue() + methanolRevenue() + ccuRevenue()).toLocaleString()} SEK/ha/år

</p>

</div>

</div>

{/\* Chart section \*/}

<div className="bg-gray-50 p-6 rounded-xl shadow-inner">

<Bar data={chartData} options={chartOptions} />

</div>

</div>

</div>

);

}