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The Agricultural Burden of Climate Regulation:
How CARB Cap-and-Trade Amendments Could Create Economic Hardship for California Farmers

Abstract

California's cap-and-trade program, administered by the California Air Resources Board (CARB), is one of the most ambitious climate policies in the United States. The system places a declining cap on greenhouse-gas emissions and requires major emitters to purchase emissions allowances. While the program aims to reduce statewide carbon emissions and fund environmental initiatives, amendments or expansions of the program have raised concerns among agricultural producers. This paper examines how cap-and-trade regulatory changes may impose economic burdens on California farmers through rising fuel and electricity costs, increased regulatory compliance, supply-chain cost inflation, and competitive disadvantages relative to out-of-state producers. Using available economic data and policy analyses, the paper concludes that the agricultural sector—already operating on narrow margins—could face significant operational and structural pressures if regulatory costs escalate further.

1. Introduction

California agriculture is one of the largest food production systems in the world. Farms and ranches in the state generate tens of billions of dollars annually and produce a large share of the nation's fruits, nuts, and vegetables. However, the sector also operates within a complex regulatory environment that includes water policy, labor rules, pesticide regulation, and climate legislation.

A central component of California's climate policy is the cap-and-trade program overseen by the California Air Resources Board. The system sets a declining statewide emissions limit and requires regulated entities—such as fuel suppliers and major industrial sources—to purchase emissions allowances or credits. Revenue generated from the program has reached tens of billions of dollars and funds various climate initiatives across the state.

Although agriculture itself is not directly regulated as heavily as some industries, farmers experience many indirect cost increases resulting from the policy. Proposed amendments or extensions to the program—especially those tightening emissions caps or expanding covered sectors—may amplify these economic effects.

2. Overview of the Cap-and-Trade System

The cap-and-trade program places a limit on greenhouse-gas emissions and gradually reduces that cap over time. Companies that emit greenhouse gases must purchase allowances through auctions or secondary markets. The program covers major emission sources such as power generation, oil refineries, and fuel suppliers, which together represent roughly 80% of California's emissions.

Key features include:

Declining emissions cap

Allowance auctions

Carbon offset credits

Revenue distribution through climate investment programs

Since its implementation, the system has generated billions of dollars in revenue for environmental projects and infrastructure improvements.

However, economic theory suggests that the costs associated with carbon pricing are frequently passed down through supply chains, ultimately affecting industries that rely heavily on fuel, electricity, and transportation—such as agriculture.

3. Energy Cost Transmission to Agriculture

One of the primary ways cap-and-trade affects farmers is through higher energy prices.

Agriculture depends heavily on energy for:

Irrigation pumping

Refrigeration

Transportation

Fertilizer production

Processing and packaging

When fuel suppliers or utilities pay for emissions allowances, those costs are typically incorporated into electricity and fuel prices.

This phenomenon creates several economic consequences for farmers:

Higher diesel prices for tractors and harvesting equipment

Increased electricity costs for irrigation pumps

Higher refrigeration and storage costs for perishable crops

California farmers already face rising electricity prices partly tied to wildfire infrastructure costs and environmental regulations, with some utility rates increasing more than 20% in recent years.

For energy-intensive crops such as almonds, rice, dairy, and vineyards, even small increases in electricity or fuel costs can significantly reduce profit margins.

4. Irrigation and Water Pumping Costs

Water pumping is one of the largest energy expenses in California agriculture.

During drought conditions, farmers often rely on groundwater pumping, which requires large electric motors and diesel pumps. Climate policies that raise electricity prices therefore have a direct financial effect on farm operations.

Past drought conditions already caused major agricultural losses, including billions of dollars in reduced crop revenue and higher pumping costs.

If cap-and-trade amendments increase electricity prices further, groundwater-dependent farms in the Central Valley could face disproportionately high operating costs.

5. Supply-Chain Cost Inflation

Cap-and-trade also increases costs in agricultural supply chains.

Key inputs affected include:

Input Cap-and-Trade Transmission Mechanism
Diesel fuel Fuel suppliers must purchase carbon allowances
Fertilizer Energy-intensive production processes
Transportation Carbon costs embedded in trucking fuel
Food processing Electricity and industrial emissions costs

These cost increases accumulate as products move from farm to consumer.

Because farmers typically sell commodities into global markets where prices are determined externally, they often cannot pass higher costs on to buyers. Instead, farmers absorb the losses.

6. Competitive Disadvantages for California Producers

Another concern is the "carbon leakage" effect.

When production costs rise due to environmental regulation, businesses may shift operations to regions with fewer regulatory constraints. In agriculture, this could manifest as:

Importing more food from other states or countries

Declining competitiveness of California exports

Reduced profitability for domestic farmers

California is the nation's largest agricultural exporter, meaning international competition already influences farm profitability.

If regulatory costs increase faster than productivity gains, California farms may gradually lose market share to producers in states with lower energy costs and fewer environmental regulations.

7. Regulatory Compliance and Administrative Costs

Beyond energy costs, farmers may face new regulatory obligations under amended climate programs.

Potential compliance burdens include:

Carbon reporting requirements

Environmental monitoring

Data reporting for agricultural emissions programs

Participation in offset verification systems

Administrative compliance may appear small relative to large corporate budgets but can be significant for family farms operating with limited administrative staff.

8. Structural Impact on Small and Family Farms

Large agribusiness operations are generally better positioned to absorb regulatory costs due to economies of scale.

Small and mid-sized farms face greater vulnerability because:

They operate on smaller margins

They have less capital for new technology

They have fewer opportunities to diversify revenue streams

As a result, climate regulatory costs may accelerate consolidation in the agricultural sector, reducing the number of independent family farms.

9. Rural Economic Effects

Agriculture is a major employer in rural California, particularly in the Central Valley.

Economic pressures on farms can produce ripple effects across rural communities:

Reduced seasonal employment

Lower demand for farm services

Declines in local tax revenue

Higher food prices for consumers

Because agriculture supports multiple downstream industries—processing, logistics, packaging, and export infrastructure—cost increases affecting farms can propagate throughout regional economies.

10. Policy Tradeoffs and Mitigation Options

While cap-and-trade aims to reduce greenhouse-gas emissions, policymakers must consider how regulatory costs affect critical industries such as food production.

Possible mitigation strategies include:

Targeted energy rebates for agriculture

Subsidies for energy-efficient irrigation technologies

Carbon-sequestration credits for soil and farmland

Gradual regulatory phase-ins for agricultural sectors

Some policy advocates argue that agriculture could also play a role in climate mitigation through soil carbon storage and regenerative farming practices, but the transition may require significant financial assistance.

11. Conclusion

California's cap-and-trade system represents a major effort to address climate change through market-based regulation. However, amendments that tighten emissions caps or expand regulatory coverage could impose substantial indirect costs on California farmers.

Through rising energy prices, supply-chain inflation, regulatory compliance burdens, and competitive disadvantages relative to out-of-state producers, climate regulations have the potential to strain an already fragile agricultural economy.

For policymakers, the challenge lies in balancing climate goals with the economic sustainability of the nation's most important agricultural region. Without careful policy design and targeted support mechanisms, regulatory costs may accelerate farm consolidation, weaken rural economies, and shift food production away from California.