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DIS Insights

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FEATURED ARTICLE

RECENT TRENDS IN IOWA'S ETHANOL BLEND SALES

By S. Patricia Batres-Marquez
Senior Research Analyst

FEATURED BUSINESS PARTNER

OUR WORK WITH MISSOURI SOYBEANS

By Merlin Siefken
Consulting Business Development Manager

MISSOURI SOYBEANS

RECENT ARTICLES

THE CONSERVATION RESERVE PROGRAM AND INTERNATIONAL TRADE SHARES OF THE U.S.

By Joy Das
Senior Research Analyst

DIS TEAM UPDATE:

MY FIRST MONTH AT DIS

By Kade Grafel
Research Analyst

DIS TEAM UPDATES

WHAT HAS KADE BEEN DOING?

After welcoming Kade Grafel to the DIS team last month, we wanted to know how his experience has been so far.

MY FIRST MONTH AT DIS

By Kade Grafel
Research Analyst

I can hardly believe that I have been working at DIS for more than a month already. It feels like I was preparing for my final exams and finishing up my senior year of university just a couple of weeks ago. Though I have not been here for long, I have already had the opportunity to work on several projects covering a variety of topics.

I grew up on a farm in northwest Kansas, where my family primarily grew wheat and corn as well as raised cattle. Since starting at DIS, I have been able to learn a lot about other aspects of agriculture. For example, one of my first projects was estimating the impact of the construction and operation of different dairy facilities. This involved acquiring information about the costs and revenues of dairies as well as researching the tradeoffs between traditional and robotic dairies.

One of my main responsibilities so far has been using IMPLAN to conduct various analyses. While I have experience with IMPLAN from my internship at the Kansas Department of Agriculture, I have been able to expand my knowledge of this software in the past month. I have learned how to conduct new types of analysis and how to use the new online version of IMPLAN.

In my most recent project, I conducted a contribution analysis of the grain and feed industries across the United States. It was very interesting to see how the prevalence of these industries varies across the country.

I use Microsoft Excel in some way nearly every day, and I have definitely increased my proficiency with the more advanced aspects of Excel over the past month. I am sure that my skill with this software will continue to increase in the future.

I have already learned so much in the short time that I have been here at DIS. I'm looking forward to further expanding my kill set and my knowledge of the many different aspects of agriculture, and I'm excited to tackle the challenges that are waiting in the months ahead!

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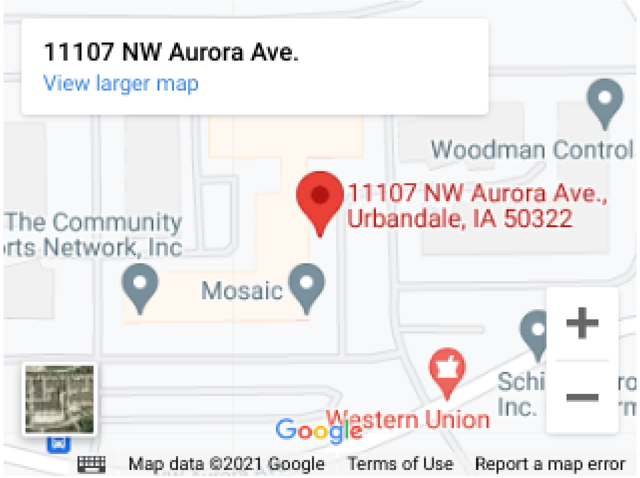

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FEATURED ARTICLE

RECENT TRENDS IN IOWA'S ETHANOL BLEND SALES

By S. Patricia Batres-Marquez
Senior Research Analyst

As a Senior Research Analyst for Decision Innovation Solutions, S. Patricia Batres-Marquez is responsible for conducting economic data analysis and modeling to evaluate agricultural policies relevant to clients to make informed decisions.

This article covers the most recent trends in ethanol blended fuel sales in Iowa. Data used comes from annual retail fuel sales data and rack level sales data collected and maintained by the Iowa Department of Revenue (IDR). Sales trends for the following fuel blends will be explored: E0, E10, Registered E15, Flex Fuel E15, E20, and E85. For an explanation on these fuel types see the endnotes.

The annual retail fuel sales data indicate that from 2015 to 2020, sales of E0[1] (ethanol-free gasoline) in Iowa averaged about 0.21 billion gallons. Sales in 2020 dropped below the 5-year average to 0.20 billion, a decrease of 5.7% relative to 2019 values (see Figure 1).

Annual Retail Sales

These data also indicate that from 2015 to 2019, sales of E10[2] in Iowa averaged 1.32 billion gallons with 2017 to 2019 sales declining at an average annual rate of 1.6%. Sales in 2020 of E10 reached 1.06 billion gallons, a decrease of 17.1% relative to 2019 values (1.284 billion gallons) (see Figure 1). The significant sales decreases experienced by both fuel types reflect the large impact of the COVID-19 pandemic on the ethanol industry. With quarantine and travel restrictions, demand for ethanol fell with the reduction in gasoline consumption, particularly during early spring of 2020.

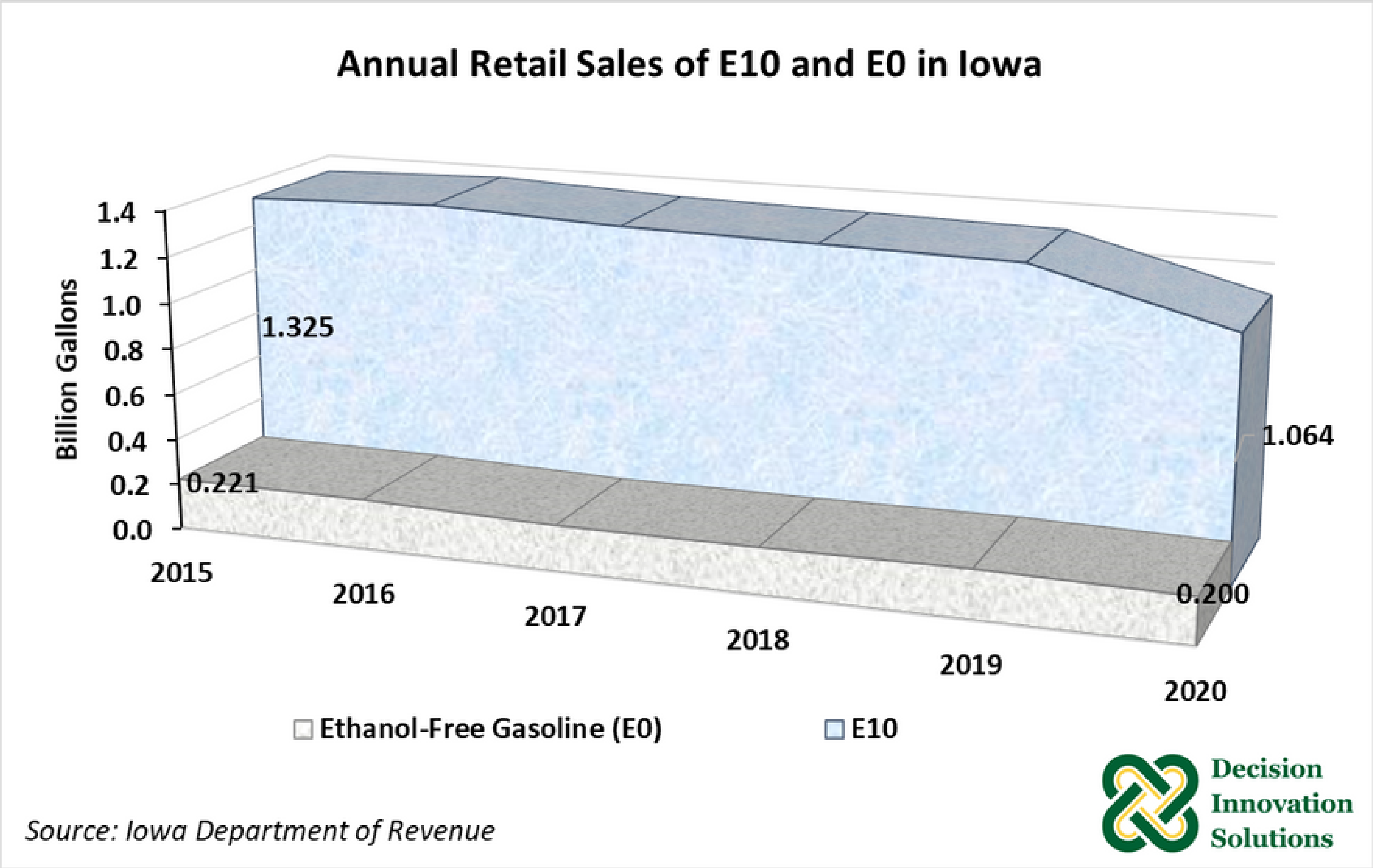


Figure 1. Annual E10 and Ethanol-Free Gasoline (E0) Retail Sales in Iowa

E15 Sales Growth

E15 in Iowa is sold and tracked in two different ways: "Registered E15[3]" which comes to the gas station pre-blended as E15 and is registered with the state as such. "Flex-fuel E15[4]" is sold through a blender pump (see Figure 2) which pulls a percentage from the E10 storage tank and a percentage from the E85 storage tank. Both fuels can be sold year-round.

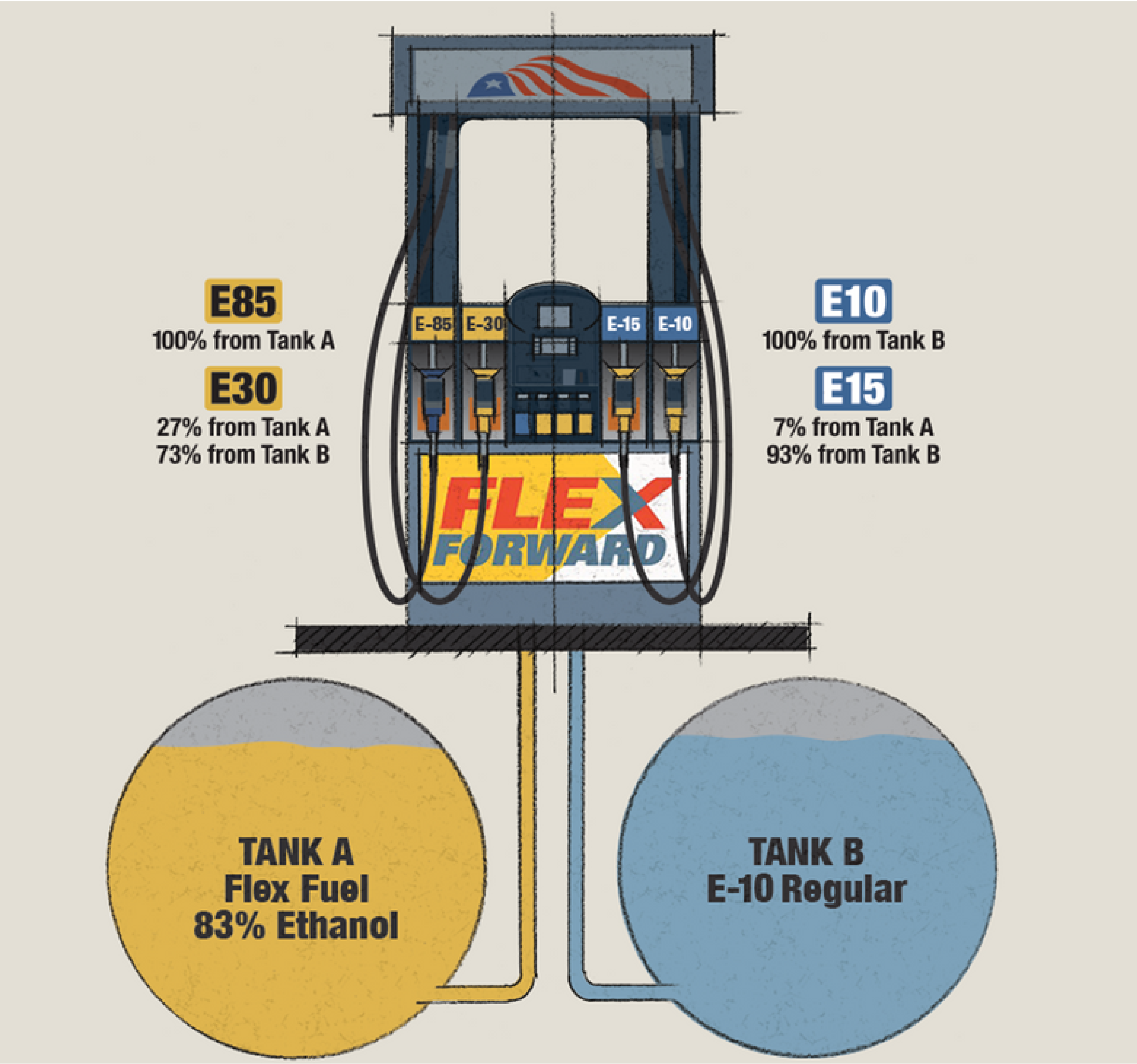
IDR data show that since 2015, sales of Registered E15 in Iowa have grown substantially (see Figure 3). Registered E15 sales in 2020 were about 35 times higher relative to 2015 (1.715 million gallons). In contrast to the decreased retail sales of E10 in 2020, Registered E15 sales increased significantly reaching 59.720 million gallons, a 25.9% increase relative to 2019 values (47.439 million gallons).

However, Flex Fuel E15 sales did not experience the same growth. In fact, IDR data show a significant decrease of Flex Fuel Sales, reaching 867,853 gallons, a 42.9% drop relative to 2019 values (1.520 million gallons).

The expansion in Registered E15 sales in 2020 is, in large part, due to the 2019 U.S. Environmental Protection Agency's (EPA) decision to lift summer restrictions limiting E15 to flex-fuel vehicles. This eliminated a significant barrier to E15 market access and allowed for year-round use of E15.

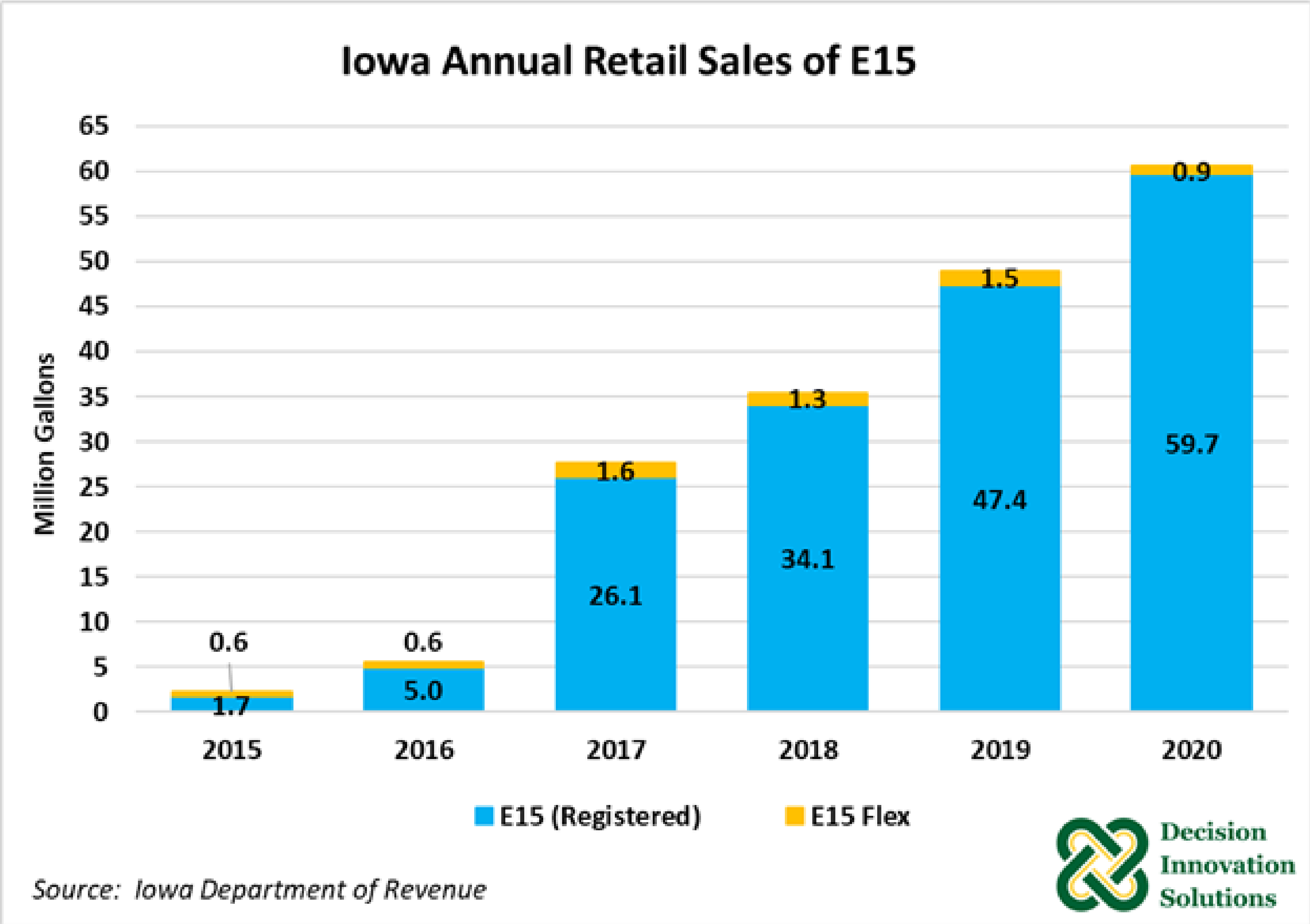
Note that on July 2, 2021, a U.S. federal appeal court reversed EPA's 2019 rule that lifted the restrictions allowing the sale of E15 year-round. However, following this reversal – as reported by Growth Energy – the bipartisan Consumer and Fuel Retailer Choice Act was introduced in the Senate.

The bill seeks to increase access to gasoline with higher ethanol blends. Approval of this bill would extend the waiver that would allow year-round sales of E15 in Iowa once again. On the same day, in the House of Representatives, a bipartisan bill was introduced Year-Round Fuel Choice Act. Approval of this bill would ensure year-round sales of E15 in all fuel markets.



Source: flexfuelforward.com

Figure 2. Blender Pump



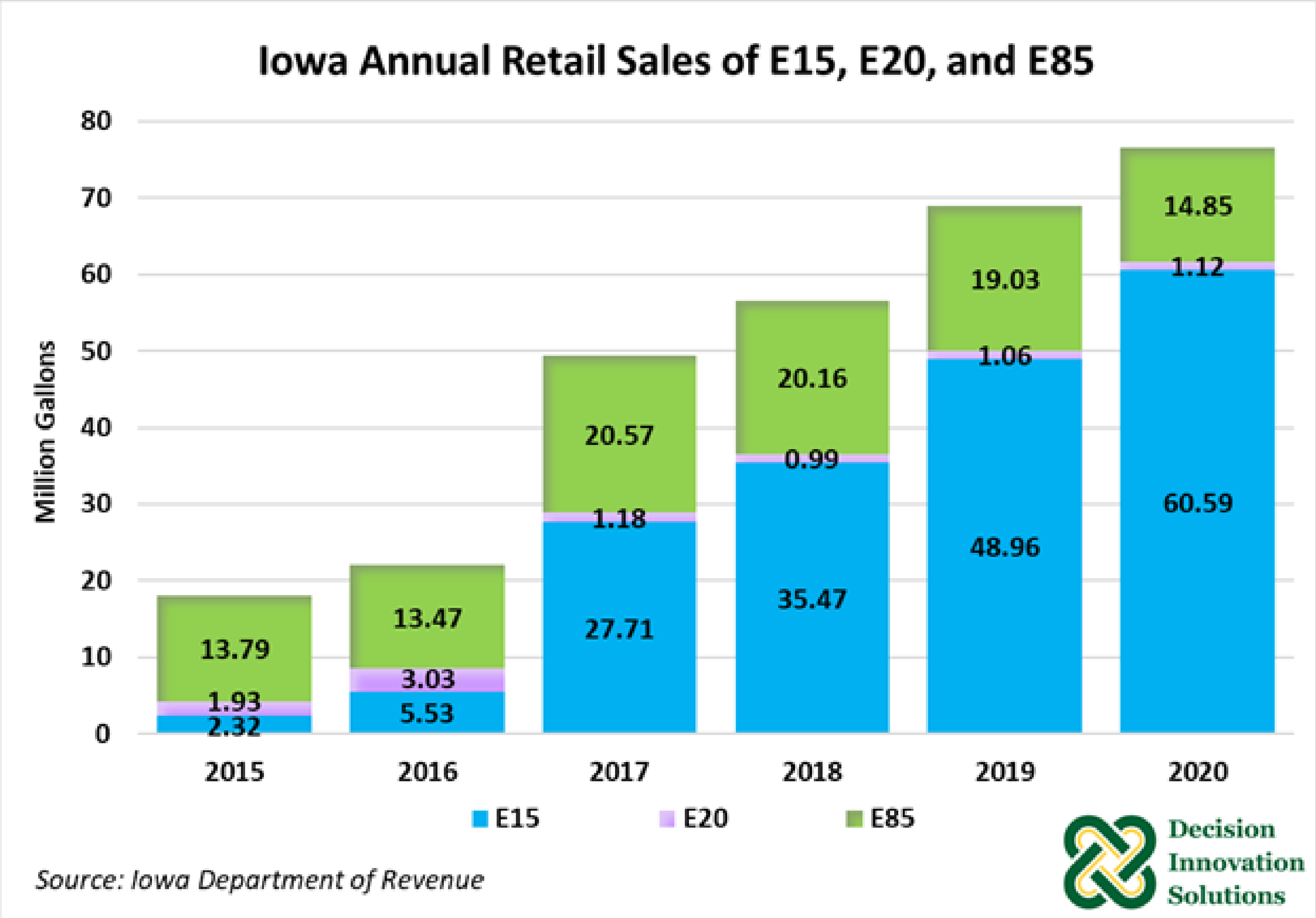
* *Ethanol blended gasoline comprised of 15% ethanol is reported by IDR as one of two types: Registered E15 and Flex Fuel E15. Registered E15 is sold by those retailers registered with the U.S. Environmental Protection Agency to sell E15 to consumers with cars built in 2001 or later to allow year-round sale of E15 gasoline. Flex fuel E15 (15% to 19% ethanol) also includes gallons sold by retailers through a blender pump at any time during the year.*

Figure 3. Annual Retail Sales of E15 in Iowa

Other Blends

E20[5] was another ethanol-gasoline blend that increased sales in 2020. According to IDR data, about 1.119 million gallons of this fuel were sold in Iowa in 2020, an increase of 62,646 gallons since 2019 (see Figure 4).

Conversely, IDR data indicate a significant decrease in 2020 E85[6] sales. Sales of E85 in Iowa reached 14.849 million gallons, a 22% from the 19.029 million gallons slod in 2019 (see Figure 4)..



* *E15 is presented in this figure as the sum of Registered E15 and Flex Fuel E15. E20 refers to ethanol blended gasoline formulated with 20% to 69% ethanol. E85 refers to ethanol blended gasoline formulated with 70% to 85% ethanol.*

Figure 4. Annual Retail Sales of E15, E20, and E85 in Iowa

Share of Total Fuel Sales by Ethanol Blend

In 2020 Iowa sold a total of 1.340 billion gallons of fuel, of which 1.141 billion gallons corresponded to the sales of ethanol-gasoline blends, and the remainder corresponded to the sales of ethanol-free gasoline (E0). Overall, the share of all ethanol blended fuels sold in Iowa to total fuel sales in 2020 was 85.1%, with the rest coming from E0 sales.

Sales of E10 remain the largest contributor to biofuel sales in Iowa. Due to the significant reduction of E10 sales in 2020, its contribution to total fuel sales dropped from 82.1% in 2019 to 79.4%. As Figure 5 shows, the share of Registered E15 to total fuel sales increased from 0.1% in 2015 to 4.5% in 2020 – up from 3.0% in 2019. The share of E20 sales has remained unchanged since 2017 at around 0.1%. The share of E20 sales has remained unchanged since 2017 at around 0.1%. The share of E85 sales relative to total fuel sales in 2020 was 1.1% – down from 1.2% in 2019.

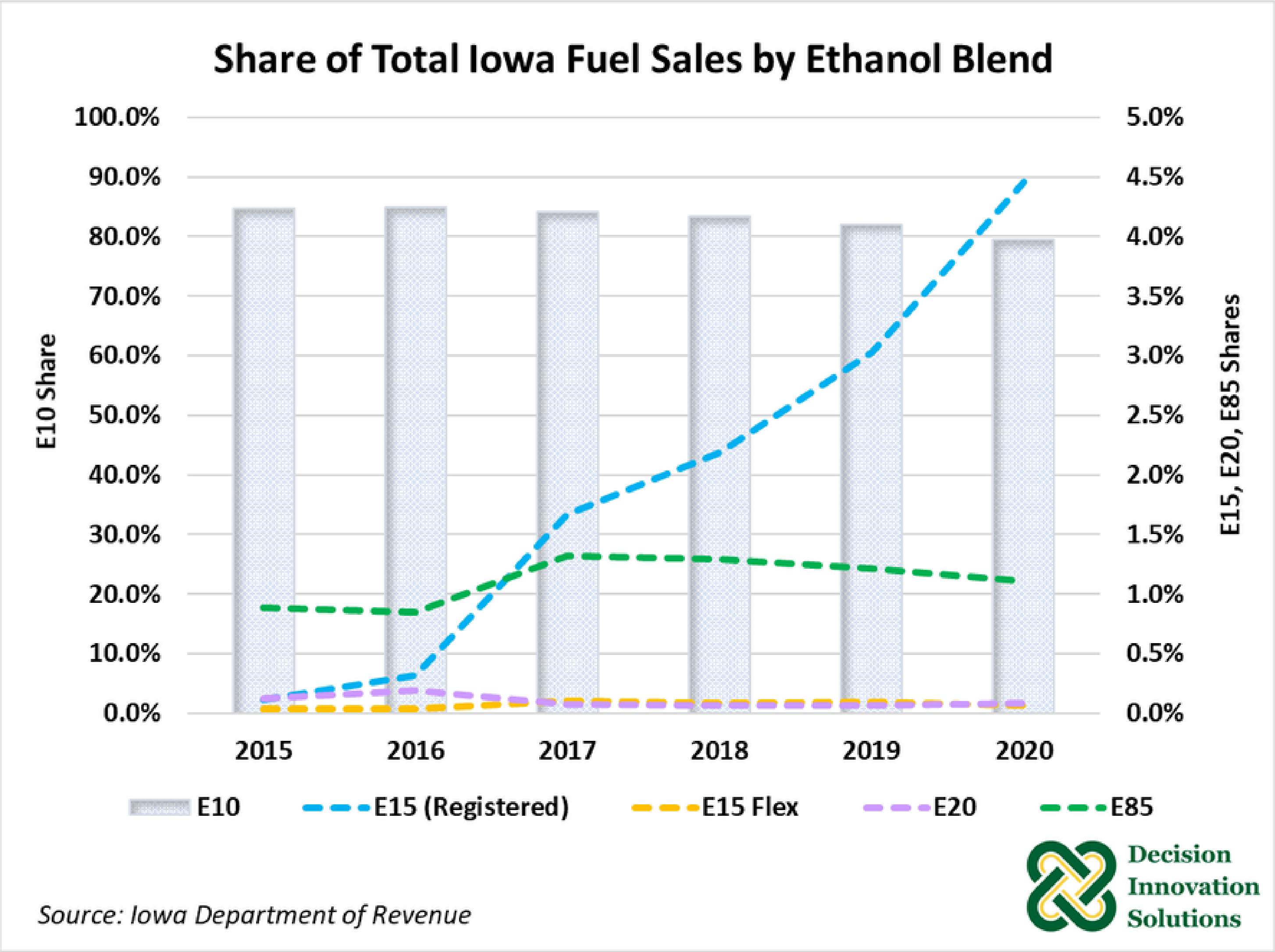


Figure 5. Share of Total Fuel Sales in Iowa by Ethanol Blend

Total Ethanol Volume

The total volume of ethanol used in ethanol-gasoline blends sold in Iowa during 2020 was estimated at 127.493 million gallons. About 106.450 million gallons of pure ethanol were used in the sales of E10 – down from 128.433 million gallons in 2019.

In addition, 11.731 million gallons of pure ethanol were used in the sales of E85 – down 15.6% year-over-year. Furthermore, 9.0 million gallons of pure ethanol was used in the sale of E15 – up from 7.1 million gallons in 2019 and up from 0.3 million gallons in 2015 (see Figure 6).

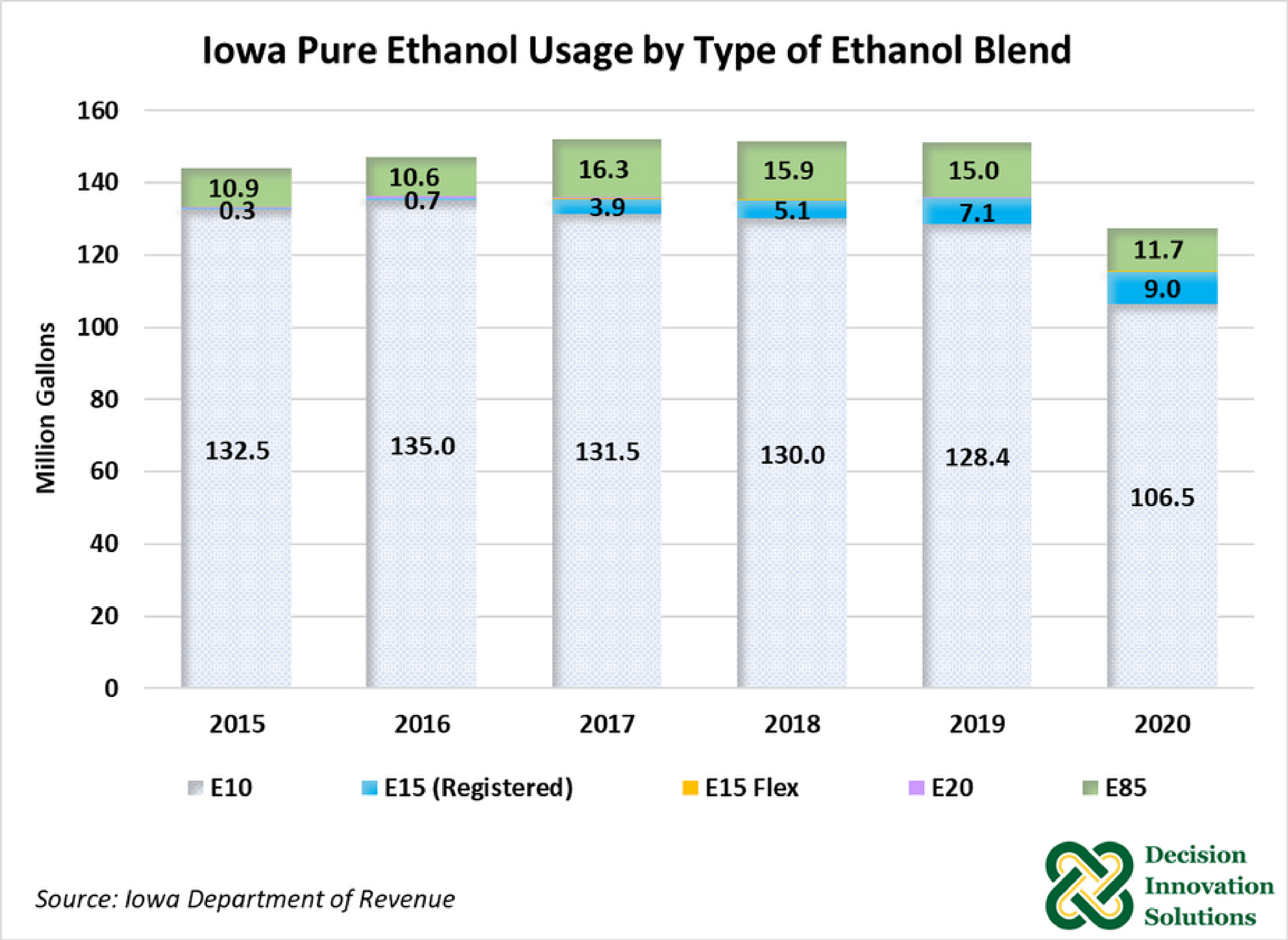


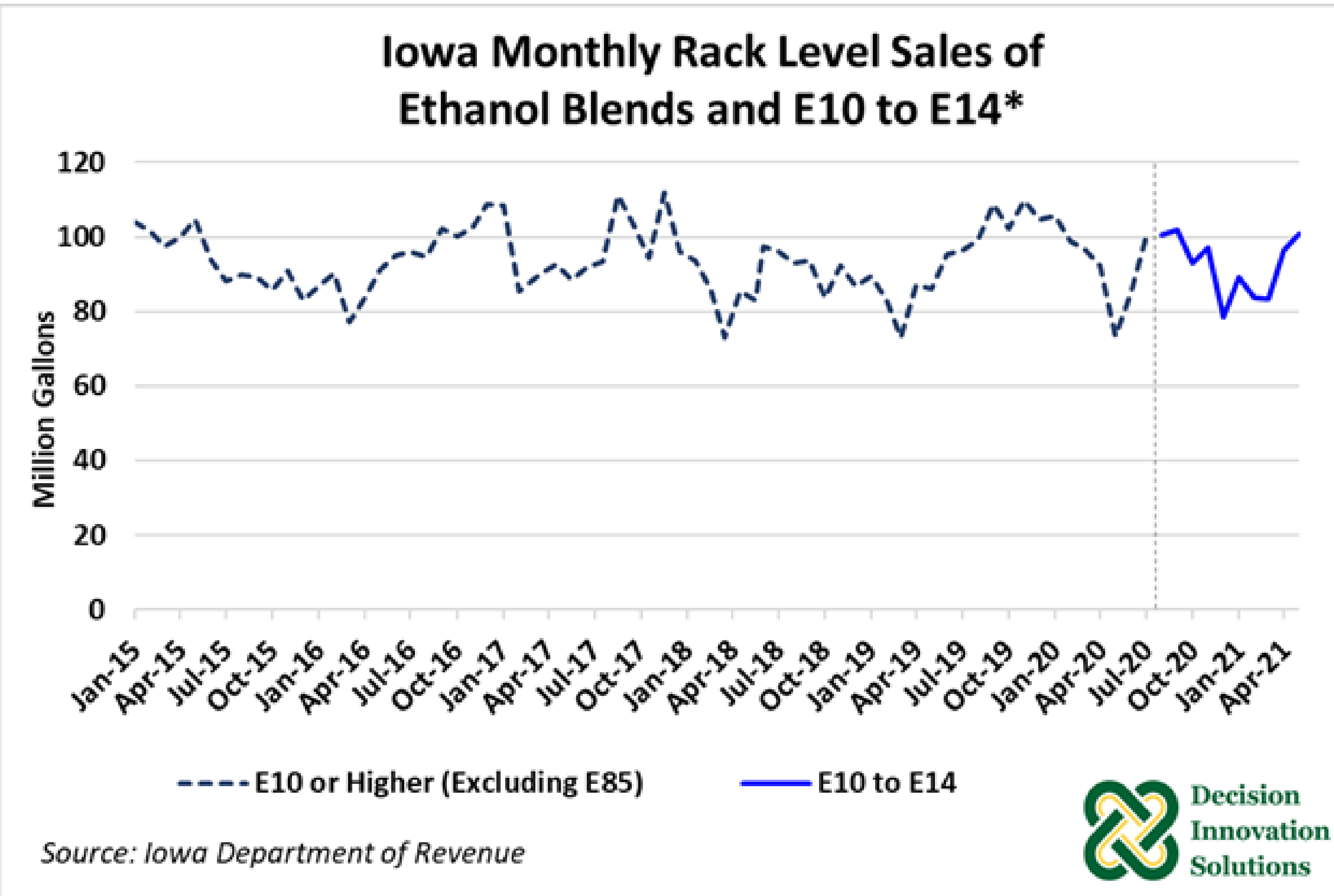
Figure 6. Pure Ethanol Usage by Type of Ethanol Blend in Iowa

Monthly Sales of Ethanol Blends in Iowa

The IDR used to publish rack level monthly sales of "ethanol blended gasoline," and E85 separately. The "Ethanol blended gasoline," mainly included sales of E10 and also may have included higher blends such as E15. As of August 2020, the IDR publishes rack level monthly sales of E10 to E14 blends, and E15 or higher blends – including E85. These changes make it difficult to compare monthly historical rack sales data published prior to August 2020 with historical rack sales data published after August 2020. For example, although the ethanol blended gasoline series mainly included E10 sales, it also included Registered E15 sales, which have been increasing since 2015. The new series – E10 to E14 sales – however, is mainly composed of E10 sales. Comparing both series could indicate larger sales during the time the old series was published – particularly during the last three years, as Regulated E15 sales were included in the series. As Figure 7 shows, sales of E10 to E14 from August 2020 to May 2021 were down 7% from sales of Ethanol blended gasoline during August 2019 to May 2020.

When comparing Iowa's old E85 monthly rack sales data series with the new E15 or higher blends data series (which includes E85), these data clearly indicate larger sales volumes of E15 or higher blends, mainly due to the significant increase in sales of registered E15 (see Figure 8). From August 2020 to May 2021, 33.564 million gallons of E15 or higher blends were sold in Iowa markets at the rack level.

Overall, the two new data series could approximately indicate the monthly trend in the sales of E10 (E10 to E14 blends series), and Registered E15 sales (E15 of higher blends series).



* *IDR started publishing sales of E10 to E14 in Aug. 2020, and at the same time discontinued publishing "Ethanol Blended Gasoline" (which was mainly E10 but included higher blends sold, except for E85).*

*Figure 7. Iowa Monthly Rack Level Sales of Ethanol Blends and E10 to E14**

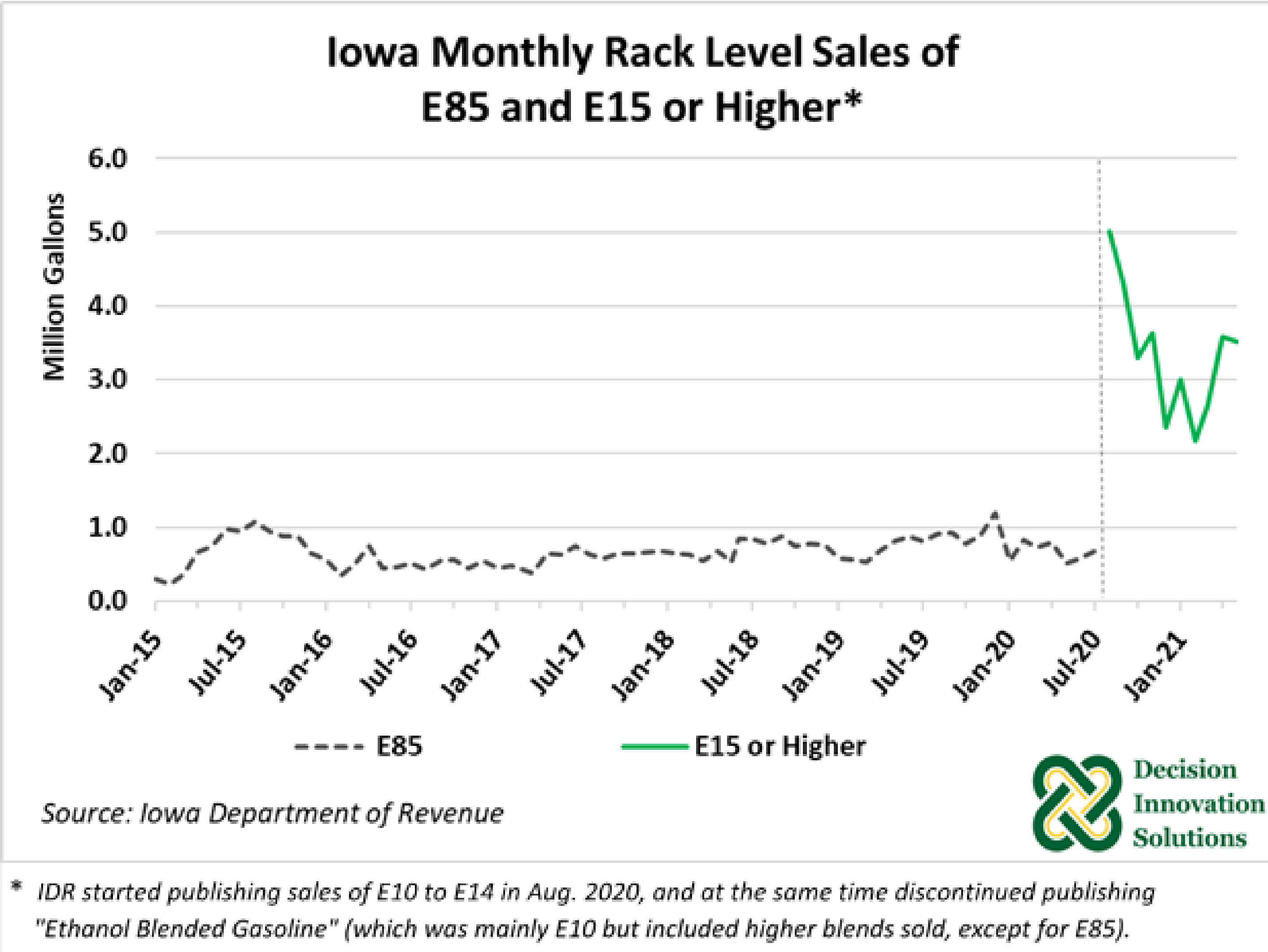


Figure 8. Iowa Monthly Rack Level Sales of E85 and E15 or Higher

Programs that Support Sales of Higher Ethanol Blends

Among the programs that support the sales expansion of higher ethanol fuel blends is the Iowa Renewable Fuels Infrastructure Program (IRFIP). The IRFIP incentivizes retail operators of motor fuel dispensing sites or fueling stations to convert their equipment to allow increased use of renewable fuels in the state. The IRFIP uses grant incentives to encourage these renovations. Reimbursement is based on the time commitment to sell certain renewable fuels: reimbursement can be up to 50% of the cost for specific components of the project for a 3-year commitment, and up to 70% for specific equipment or installation costs for a five-year commitment. According to Iowa Department of Agriculture & Land Stewardship, to date, the program has distributed – or obligated – more than $38 million to help fund 335 E85 dispensers/blenders, 362 biodiesel dispensers/blenders, 72 E15 projects, and 143 biodiesel terminals in Iowa.

In addition to the IRFIP, the USDA's Higher Blends Infrastructure Incentive Program (HBIIP) seeks to substantially increase the sales and use of higher ethanol fuel blends (e.g., E15) and biodiesel (e.g., B20), created from U.S. agricultural products, through the expansion of renewable fuel production infrastructure. The HBIIP supports the sales of higher blends by sharing the costs associated with building biofuel related infrastructure. According to the Iowa Renewable Fuels Association (IRFA), in October of 2020 the USDA announced the grantees of $22 million worth of HBIIP grants across 14 states, making it possible for those fuel retailers to supply higher blends of biofuels. According to the announcement, the $22 million granted was the first round of awards coming from the $100 million program. Among the recipients there were 15 Iowa fuel suppliers.

Iowa is increasing its contribution to the reduction of greenhouse gas emissions by expanding the sales of higher ethanol blends, particularly E15. Approval of the recently introduced legislature in the U.S. Congress, would ensure year-round sales of E15 in all fuel markets.

Endnotes:

[1] E0 – Fuel blended with 0% ethanol, referred to as "Ethanol-Free Gasoline."

[2] E10 – Fuel blended with 10% ethanol.

[3] Registered E15 – Fuel pre-blended with 15% ethanol, sold only by retailers registered with the U.S. Environmental Protection Agency to sell E15 to cars made in 2001 or later.

[4] Flex Fuel E15 – Fuel blended on site by a blender pump resulting in a fuel containing 15% to 19% ethanol.

[5] E20 – Fuel blended with 20% - 69% ethanol.

[6] E85 – Fuel blended with 70% - 85% ethanol.

FEATURED BUSINESS PARTNER

OUR WORK WITH MISSOURI SOYBEANS

By Merlin Siefken

Consulting Business Development Manager

Merlin Siefken contracts with DIS to provide Business Development services. He is responsible for maintaining and enhancing existing business relationships, conducting research of new product lines and service offerings, collaborating with the DIS team on project development and administration and identifying prospective customers.

Decision Innovation Solutions (DIS) has enjoyed its working relationships with numerous state and national commodity organizations. These associations play an important role in advocating for the producers and value-added processors who grow and add value to their commodity.

The Missouri Soybean Merchandising Council and Missouri Soybean Association provide an excellent example of the important work it undertakes to promote the soybean industry. Over the years, our DIS team has had the opportunity to work with Gary Wheeler, Executive Director; Tony Stafford, Director of Business Development & New Markets; Matt Amick, Director of Biofuels & New Uses, and most recently; Casey Wasser, Chief Operating Officer and Senior Policy Director.

Gary Wheeler and his staff are very effective advocates for the production, processing, and transportation of soybeans within the state of Missouri.

Our first opportunity to work with Missouri Soybean was connected to the 2016 Missouri Agriculture & Forestry Economic Contribution Study. This study showed the economic contributions of all agriculture & forestry-related industries, was supported by Missouri commodity organizations, and funded by the Missouri Agriculture and Small Business Development Authority (MASBDA).

Once the initial study was completed, the Missouri Soybean team sought a deeper dive into the soybean industry based on the recently completed study, and thus began our great working relationship.

In 2018, the Missouri Soybean team and the DIS team discussed the concept of a Commodity Flow & Infrastructure study for the state of Missouri. Other commodity groups were contacted to gain their support for the study. The study covered all of Missouri and included the flow of commodities and value-added products within the state, as well as the intrastate movement of commodities and value-added products. Project work began late in 2018 and was completed in January of 2020. This project was the first of its kind for DIS, which led to the in-house development of a methodology we now call "Dynamic Commodity Flow Analysis."

Shortly after completing the commodity flow study, the DIS team was contacted by Missouri Soybean regarding the growing interest within the state to mandate higher blends of biodiesel in the state. As a result of those discussions, the DIS team conducted a study named "Increased Biodiesel Use in Missouri," sponsored by their partners at the Biodiesel Coalition of Missouri.

Our latest opportunity of working with the great team at Missouri Soybean is in connection with the 2021 Agriculture & Forestry Economic Contribution study – an update of the 2016 study. This new study is again supported by commodity groups, the Missouri Department of Agriculture, and the Missouri Farm Bureau, and funded through MASBDA. The DIS team is currently working on this project to have the data available for the upcoming Governor's Conference on Agriculture in November of this year.

We value our relationship with the Missouri Soybean team and all the other businesses, associations, government agencies, and individuals we have had the opportunity of working with over the years. We look forward to continued work with our valued partners, and more especially the opportunity to do what we not only love but excel at: Telling the story of agriculture.

As a joint effort of the advocacy-focused MSA and the marketing- and research-focused MSMC, MoSoy is a must visit for every Missouri soybean farmer. It provides information on soy-based products, a recap of the latest news affecting soybean operations, and a detailed background on the MSA and MSMC.

RECENT ARTICLE

THE CONSERVATION RESERVE PROGRAM AND INTERNATIONAL TRADE SHARES OF THE U.S.

By Joy Das, Ph.D
Senior Research Analyst

Joy Das, Senior Research Analyst at Decision Innovation Solutions, conducts research and analyzes data to estimate economic impacts and develop forecasts. He prepares reports and formulates plans to address economic problems related to the impacts of international trade on the production and distribution of goods and services.

With the onset of the U.S. Conservation Reserve Program (CRP) in 1986, millions of acres of farmland began being enrolled in the conservation program and the loss of U.S. croplands started accelerating. Furthermore, data indicate that while croplands in the U.S. and other high-income economies decrease, croplands of low- and middle-income economies have continued to increase since 1986. Crop-wise and country-wise empirical investigation of this trend show that the international market has responded to the U.S. idled acres by planting and harvesting more acres of the crops for which the U.S. has foregone production.

Table one shows the regression results reflecting the impact of the U.S. idled acres on competing countries' harvested acreage of corn, cotton, sorghum, soybeans, and wheat.

Data indicate that an increase of U.S. idled acres – otherwise used for corn, sorghum, and soybean production – has a positive and statistically significant effect on Brazil's harvested acres of these commodities. On an average, a one percent increase of the current 10 million acres of idled U.S. corn, soybean, and sorghum cropland would result in Brazil increasing its current 100 million crop acres of harvested corn, soybean, and sorghum by 0.375% in the subsequent year (see Table 1).

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positive and statistically significant effect on Brazil's harvested acres of these commodities. On an average, a one percent increase of the current 10 million acres of idled U.S. corn, soybean, and sorghum cropland would result in Brazil increasing its current 100 million crop acres of harvested corn, soybean, and sorghum by 0.375% in the subsequent year (see Table 1).

Data indicate that an increase of idled U.S. acres – otherwise used in cotton production – also has a positive and statistically significant effect on the total harvested acres of cotton in the following seven areas: Argentina, Australia, Brazil, Canada, the EU, the FSU, and South Africa. On an average, if U.S. idled cotton acres increases by one percent, these areas would be expected to increase harvested cotton acres from a combined 11.144 million acres to 11.175 million acres in the subsequent year – an increase of 0.27%. Looking at Argentina, the FSU, and Australia individually: Argentina would be expected to increase harvested cotton acres by 0.61%, from 995,833 acres to 1.001 million acres, in the subsequent year; the FSU would be expected to increase harvested cotton acres by 0.14%, from 5.296 million acres to 5.304 million acres, in the subsequent year; and Australia would be expected to increase harvested cotton acres by 0.27%, from 958,273 acres to 960,860 acres, in the subsequent year (see Table 1).

Data also indicate that an increase of idled U.S. acres – otherwise used in wheat production – also has a positive and statistically significant effect on the total

Table 1. Regression Analysis of U.S. Idled Acres and International Harvested Acres

Regression Analysis on U.S. Idled Acres on International Acreages From 1982-2020

Variables*	One percent Change in U.S. Idled Acres	Change in Competing Country Acreage
Corn, Sorghum and Soybean - Brazil	100,000	375,000
Cotton – 7 Area Total	10,214	30,091
Cotton – Argentina	10,214	6,075
Cotton – FSU	10,214	7,415
Cotton – Australia	10,214	2,587
Wheat – Brazil	76,605	22,196
Wheat – South Africa	76,605	5,454

Note: *Dependent Variable = Competing Country Harvested Acres

Base period, 1982-1995

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harvested acres of cotton in Brazil and South Africa. On average, if U.S. idled wheat acres increases by one percent Brazil would be expected to increase harvested wheat acres by 0.41%, from 5.414 million acres to 5.436 million acres, in the subsequent year; South Africa would be expected to increase harvested wheat acres by 0.43%, from 1.268 million acres to 1.274 million acres, in the subsequent year (see Table 1).

Furthermore, these data indicate that in competitive international markets, acreage idling often creates an opportunity for competitors to take advantage of the foregone production of the country that idles otherwise productive cropland. Moreover, data also indicate this same behavior concerning shorter-term reductions of planted acres of the before-mentioned commodities (see Table 2).

Table 2 Regression Analysis of U.S. Planted Acres and Competing Country Planted Acres

Regression Analysis on U.S. Planted Acres on International Acreages 1982-2020		
Variables*	**One percent Change in U.S. Planted Acres**	**Change in Competing Country Acreage**
Wheat – Brazil vs United States	**432,289-acre reduction**	**191,757 acres of additional production**
Cotton – FSU vs United States	**95,784-acre reduction**	**10,670 acres of additional production**
Cotton – Argentina vs United States	**95,784-acre reduction**	**8,538 acres of additional production**
Corn, Sorghum, and Soybean - Brazil vs United States	**1.7-million-acre reduction**	**650,000 acres of additional production**
Note: *Dependent Variable = Competing Country Planted Acres Independent Variable = U.S. Planted Acres Base period, 1982-1995		

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With the response of competing countries to idling U.S. croplands being to increase their harvested acres, and considering the intensity at which U.S. croplands have been idled under the CRP, total forgone production in the U.S. due to the CRP was calculated. The cumulative total forgone production of crops since 1986 – due to the CRP – is estimated to be about 1,600 million Tons (see Figure 1).

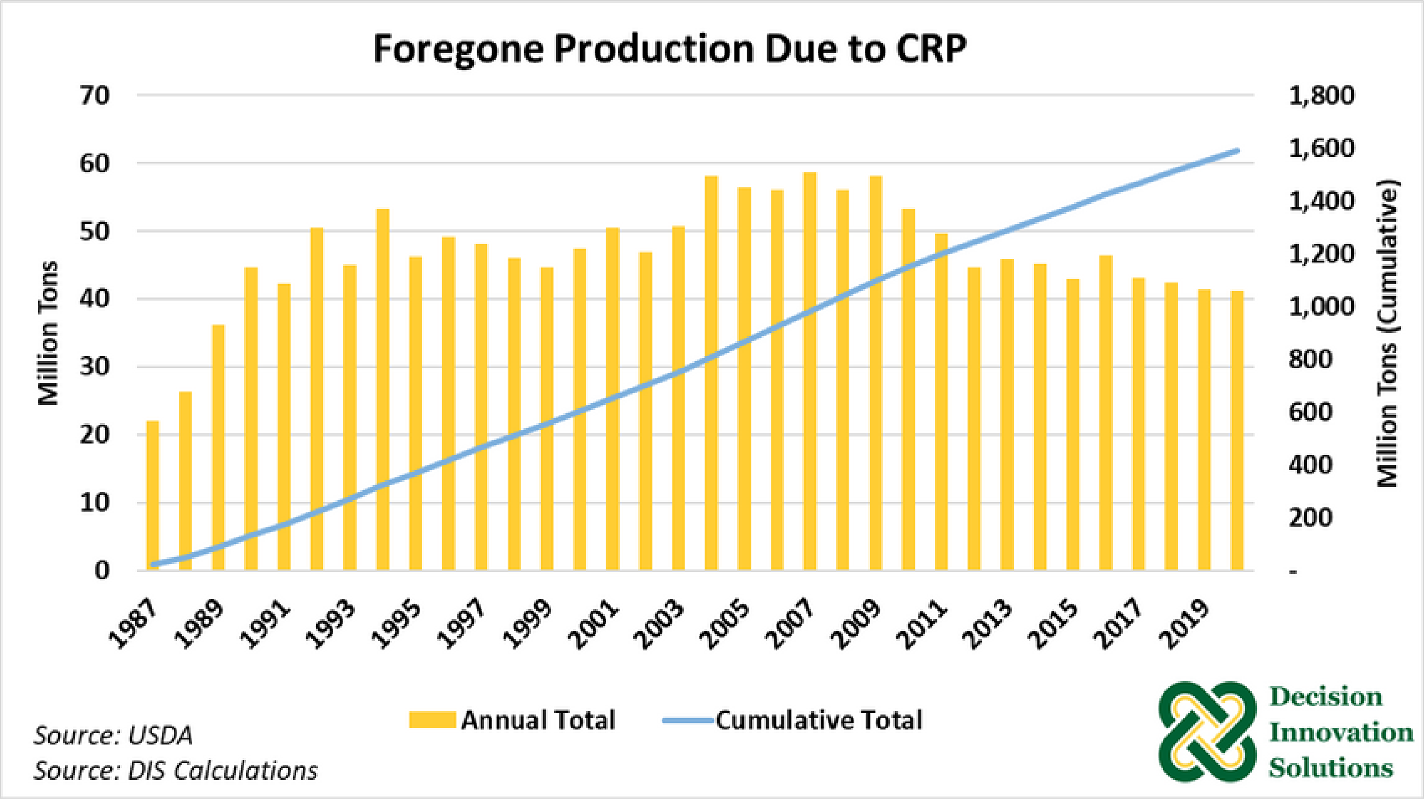

Figure 1. Foregone Production in the U.S. Due to CRP

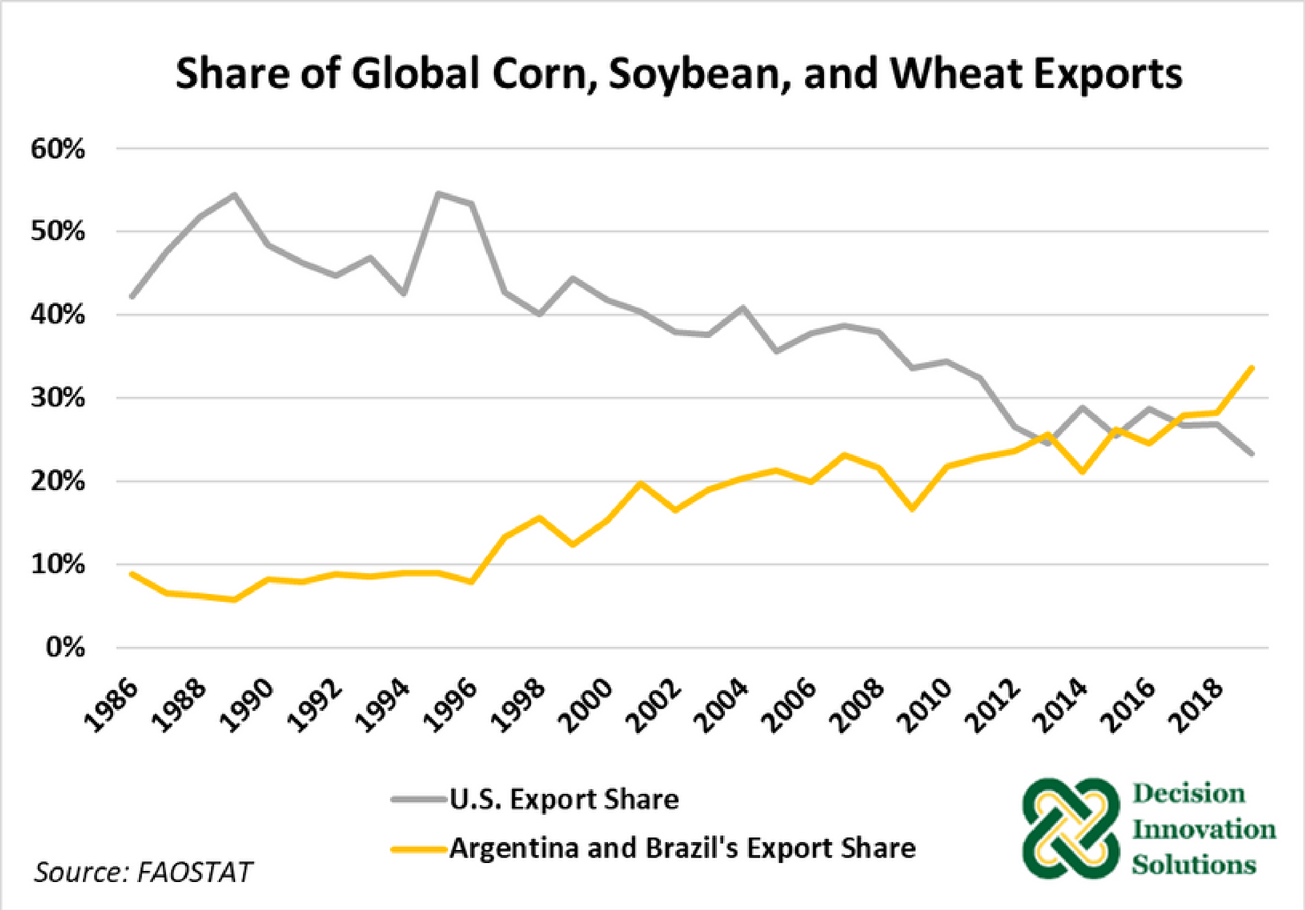

Figure 2. Export Share of Corn, Soybean, and Wheat

The idling of CRP land has several other consequences including international trade. The decline in the U.S. share of exports since 1986 is shown in Figure 2. Data indicate that the U.S. trade share has declined from about 45% in 1986 to about 23% in 2018. In contrast, Argentina and Brazil's combined trade share has increased from about 10% in 1986 to about 33% in 2018 – surpassing the U.S. Therefore, due to idling CRP land the U.S. position in, and contribution to, the export market has been impacted. Furthermore, during this period the share of the revenue that could have come to the U.S. with the export of crops otherwise produced on this land was foregone.

Moreover, the growth in world populations and per capita food consumption has increased the overall demand for grains across the world (Mottaleb et. al. 2018). The U.S. is currently unable to meet the excess market demand due to compromised production caused by the idling of cropland across the country. Instead, the excess demand has primarily been met by competing countries and areas such as Argentina, Australia, Brazil, China, the EU, the FSU, and South Africa. Many of these are developing countries with low nfrastructure and/or low-quality pollution abatement technologies. Other such developing countries have also increased their production to meet the growing global food demand. To achieve higher production, these developing countries either cut down forests to increase cropland acreage, or they intensify production which often leads to the degradation of soil quality as many of these soils are more prone to erosion and loss of fertility. Deforestation, soil erosion, sedimentation, and the use of low-quality fuels and technology by these developing countries further lead to an increase in overall global pollution and environmental degradation.

The motivation to retire environmentally sensitive and highly erodible cropland from production is to restore soil quality and improve the overall environment. Higher-income developed countries, such as the U.S., are the proponents and active participants in government programs like the CRP which idles otherwise productive cropland to achieve this. However, it appears that the stalwart efforts of these developed countries are being counteracted by those of developing countries to meet the increasing global food demand.

References:

- Mottaleb, Khondoker Abdul, Gideon Kruseman, and Olaf Erenstein. "Evolving food consumption patterns of rural and urban households in developing countries." British Food Journal (2018).

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