

# Box 3

## Some Effects of the Most Recent Access Road Closures in the Llanos Orientales on the Regional Economy

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So far this year, two events have resulted in the closure of the roadways that connected the eastern plains region of Colombia - the Llanos Orientales- with the country’s central region. These happenstances were the avalanche in the Quetame-Cundinamarca tranche on July 18 and the Los Grillos bridge collapse on the Cusiana crossroads on August 20. Unsurprisingly, both events adversely affected land transportation to and from the region, potentially impacting the Llano’s economic activity and the prices of products distributed to other municipalities, a behavior whose aggregate effect could be mirrored at a national level.

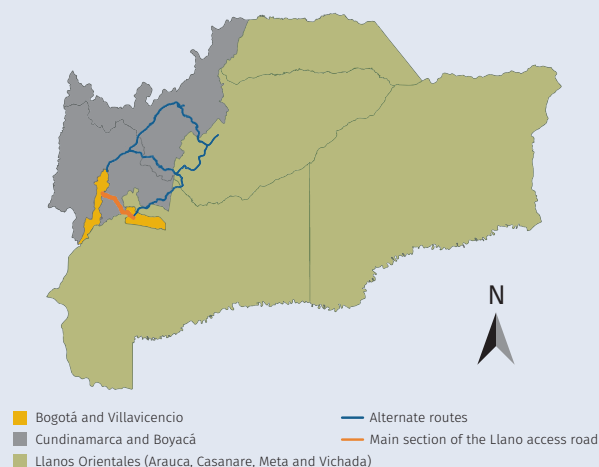
The focus of this Box is to explore through various economic indicators the effect of the recent road closures in the Llano on the region’s economic activity. Several of these indicators were used to construct the third-quarter economic activity forecast presented in this Report.

### 1. Background

The Llanos Orientales region, which comprises the departments of Arauca, Casanare, Meta, and Vichada, accounts for about 5.7% of the country’s value added. Given its oil and natural gas deposits, it is considered one of the country’s principal regions for potential growth of the mining-energy sector, currently contributing 50% of its real production. Agricultural activities are also a vital mainstay of the local and national economy, supplying various areas of the country with multiple products, including rice, palm oil, corn, and beef. Additionally, tourism activities have recently accelerated the region’s growth, taking advantage of its fauna and flora diversity.

However, the region is located in a geographic expanse that features topographical challenges and unstable gradients, making it highly sensitive to adverse weather conditions such as excessive rainfall. These factors, among others, have affected the physical conditions of its road networks through both temporary closures of its main access road—the dual carriageway Llano highway<sup>1</sup>—and the two alternate routes—the Sisga and Cusiana roads<sup>2</sup>—that connect the nation’s capital, Bogotá, with the region’s principal city, Villavicencio. (Map B3.1).

Map B3.1  
 Road network in the Llanos Orientales<sup>a/</sup>

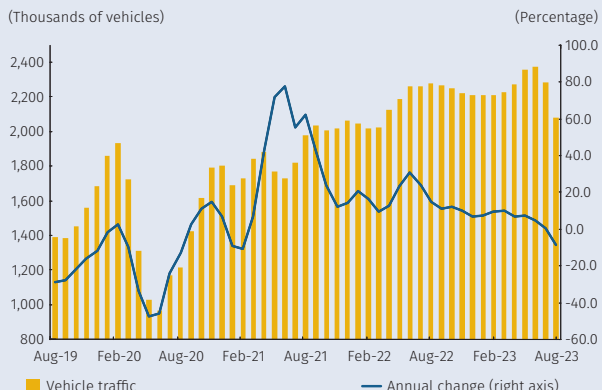


a/ The Llanos Orientales region comprises the departments of Arauca, Casanare, Meta, and Vichada.  
 Sources: Invias (National Roads Institute); calculations by Banco de la República.

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- 1 The dual carriageway to the Llanos, which is part of the Puerto Carreño- Buenaventura transversal corridor, extends 89.8 kilometers through the municipalities of Usme, Cáqueza, El Tablón, Quetame, Guayabetal, Chirajara and Buenavista.
- 2 The Transversal del Sisga tranche connects Bogotá and Villavicencio through the municipalities of Mchetá, Guateque, Santa María, San Luis de Gaceno, El Secreto,

**Graph B3.1**  
Total vehicle traffic through the tolls of the Llanos access roads<sup>a/</sup>, <sup>b/</sup>



a/ The Llanos Orientales region comprises the departments of Arauca, Casanare, Meta, and Vichada.  
b/ Series seasonally adjusted and corrected for calendar effects  
Sources: National Infrastructure Agency (ANI); calculations by Banco de la República. Preliminary data to August 2023.

The main road closures include the Chirajara bridge collapse in 2018 at kilometer 58 due to the 2019 intense rainy season and the above-mentioned road closures that befell this year.

These last temporary closings affected chiefly land transportation. According to figures from the National Infrastructure Agency (ANI for its Spanish acronym), vehicle traffic through the Llanos tolls<sup>3</sup> with seasonally adjusted rolling quarter data, registered monthly decreases of 3.8% and 7.8% in July and August, respectively (Graph B3.1), coinciding with the months when the incidents occurred; year-on-year, 15.8% fewer vehicles transited through the tolls in these two months versus the same period of the previous year.

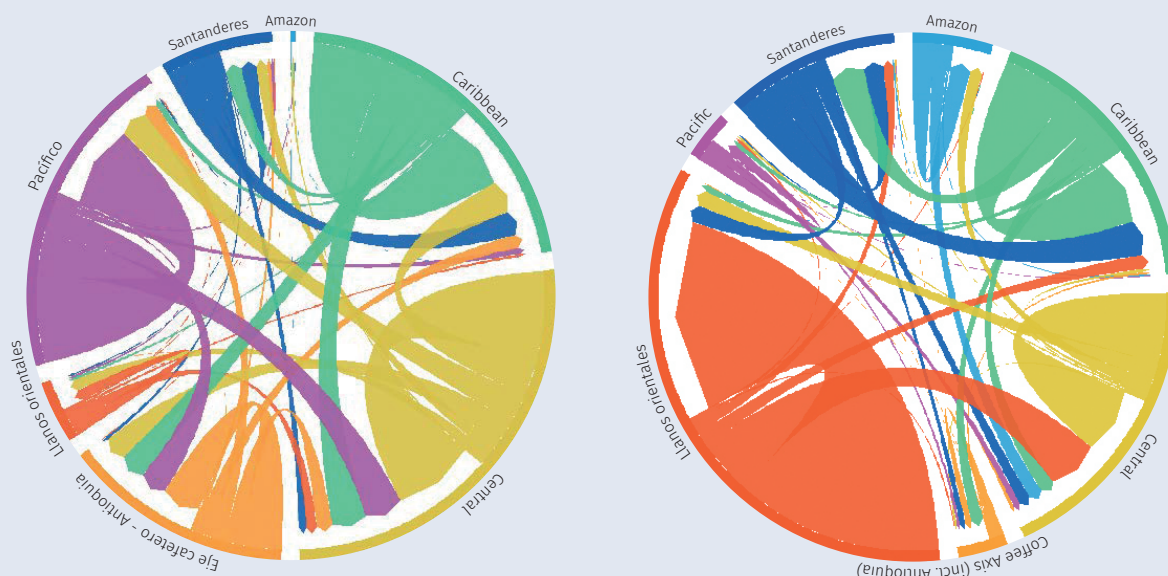
## 2. Movement of Goods

The National Registry of Cargo Dispatch (RNDC for its Spanish acronym) of the Ministry of Transport of Colombia consolidates the road freight manifests of the country's registered logistics companies, which allows the identification of the domestic movement of goods at the regional level.<sup>4</sup> Graph B3.2 summarizes origin/destination move-

**Graph B3.2**  
Merchandise flows between regions<sup>a/</sup>  
(Average for the period from Jan-2015 to Aug-2023)

A. Solid land cargo (tons)

B. Liquid land cargo (gallons)



a/ The Llanos Orientales region comprises the departments of Arauca, Casanare, Meta, and Vichada.  
Sources: National Registry of Cargo Dispatch (RNDC) of the Ministry of Transport; calculations by Banco de la República.

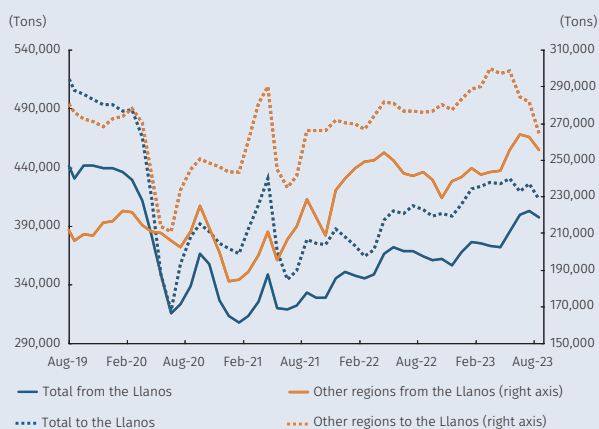
Aguaclara, Villanueva and Barranca de Upía. It extends for close to 274 kilometers. For its part, the Trasnversal de Cusiana is over 325 in length and covers the municipalities of Tunja, Sogamoso, Aguazul, Villanueva and Barranca de Upía.

- 3 These are the Boquerón I, Boquerón II, Casetabla, Iracá, La Libertad, Naranjal, Ocoa, Pipiral, Puente Amarillo, Puente Quetame, San Pedro, Veracruz and Yucao tolls.
- 4 The RNDC information is disaggregated by population center; however, the analysis presented in this Box aggregates freight flows by region using the following classification: 1) Amazon region: includes the departments of Amazonas, Caquetá, Guainía, Guaviare, Putumayo and Vaupés; 2) Caribbean region: includes the departments of Atlántico, Bolívar, Córdoba, Cesar, La Guajira, Magdalena, Sucre, and San Andrés y Providencia; 3) Central region: comprises Bogotá D.C., and the departments of Boyacá, Cundinamarca, Huila and Tolima; 4) Coffee Belt region: includes the departments of Antioquia, Caldas, Quindío and Risaralda; 5) Pacific region: includes the departments of Cauca, Chocó, Nariño and Valle del Cauca; and 6) Santanderes region: encompasses the departments of Norte de Santander and Santander.

ments between regions according to the average tons and gallons transported between January 2015 and August 2023. Concerning solid land freight, the Central region is characterized for shipping the largest share of goods to the rest of the country, representing about 28.4% of total domestic freight, resulting from the flow of imported goods that are conveyed to the domestic market from the ports of Buenaventura and Cartagena; it is followed by the Pacific (23.7%) and the Caribbean (23.2%) regions.

Conversely, the Llanos Orientales region contributes only 4.0% of the total solid cargo to the national total, although it is the region with the highest share in the transport of liquid cargo nationally (40.6%), mainly owing to the local production of crude oil, gases, and other flammable liquids. Most of the goods produced in the region are sent to regional departments to cover domestic demand. Specifically, on average, 41.3% of the regional goods produced are consumed domestically, 37.7% are dispatched to the Central region to provision specific agricultural products supply channels in the city of Bogotá and some municipalities of Cundinamarca, and 10.2% are shipped to the Caribbean region.

**Graph B3.3**  
Road transport of solid cargo between the Llanos and other regions of the country (series in moving quarter) <sup>a/, b/</sup>



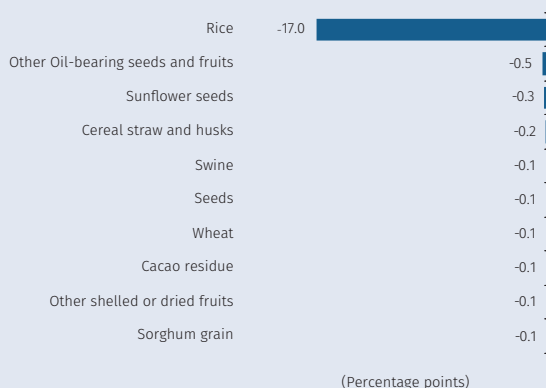
a/ The Llanos Orientales region comprises the departments of Arauca, Casanare, Meta, and Vichada.  
b/ Series seasonally adjusted and corrected for calendar effects  
Sources: RNDC- Ministry of Transport; calculations by Banco de la República.

According to seasonally adjusted data from the RNDC, in the rolling quarter to July and August, the movement of goods by road from the Llanos Orientales to the rest of the country registered a monthly decrease (-0.7% and -2.6%, respectively), mainly due to a reduction in the flow of goods to the Central, Pacific, and Coffee Belt regions (the latter includes Antioquia). It should be emphasized that this behavior was partially offset by the continued vitality seen in the intra-departmental flows within the region, which have an important share in the movement of total tons from the Llanos Orientales (Graph B3.3). There was also a marginal decrease in the volume of solid cargo moved from the rest of the country to the region due to lower tonnage from the Central, Caribbean, and Santanderes regions.

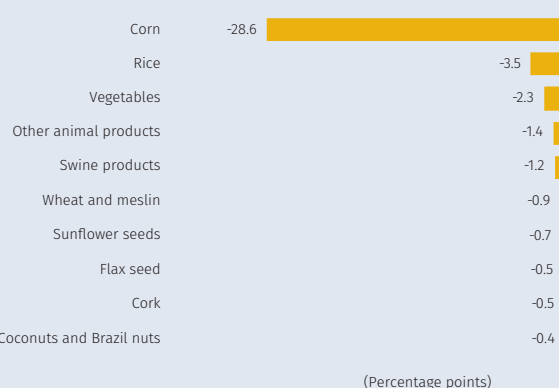
In the July-August cumulative period, agriculture and livestock was the sector that showed the most significant reduction in the movement of cargo from the Llanos Orientales (-13.3% annually) due to a decrease in the volume of tons transported of products such as rice, oil-bearing seeds and fruits, sunflower seeds, cereal straw and husks, and live swine, which together contributed -18.0 percentage

**Graph B3.4**  
Contribution to the annual change of agricultural and livestock cargo of the Llanos<sup>a/</sup>  
Principal products (Average Jul-Aug 2023 vs Jul-Aug 2022)

**A. From the Llanos Orientales**



**B. To the Llanos Orientales**



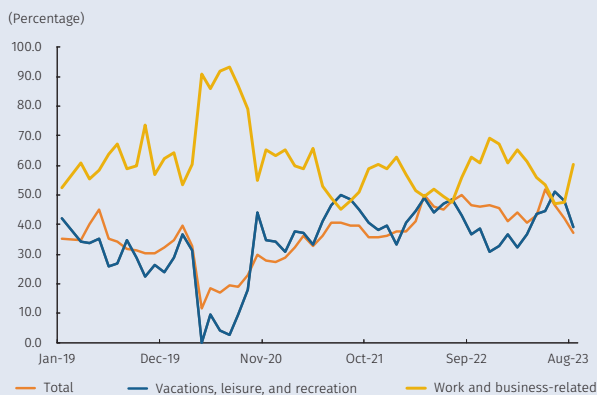
a/ The Llanos Orientales region comprises the departments of Arauca, Casanare, Meta, and Vichada.  
Sources: RNDC- Ministry of Transport; calculations by Banco de la República.

**Graph B3.5**  
Llanos Orientales inter-municipal passenger traffic<sup>a/ b/</sup>



a/ The Llanos Orientales region comprises the departments of Arauca, Casanare, Meta, and Vichada.  
b/ Series seasonally adjusted and corrected for calendar effects  
Sources: Superintendencia de Transportación; cálculos by Banco de la República.

**Graph B3.6**  
Llanos Orientales hotel occupancy rate a/ b/  
(Total and by purpose of trip)



a/ The Llanos Orientales region comprises the departments of Arauca, Casanare, Meta, and Vichada.  
b/ Series seasonally adjusted and corrected for calendar effects  
Sources: DANE's Monthly Hotel Survey; cálculos by Banco de la República.

**Graph B3.7**  
Aggregate indices of income, employed personnel and salaries of the hotels of the Llanos Orientales<sup>a/, b/</sup>  
(January 2019 base = 100)



a/ La región de los Llanos Orientales está conformada por los departamentos de Arauca, Casanare, Meta y Vichada.  
b/ Series desestacionalizadas y ajustadas por efecto calendario.  
Fuente: Encuesta Mensual de Alojamiento - DANE; cálculos del Banco de la República.

points (pp) to the yearly change (Graph B3.4). The flow to the Llanos Orientales also fell by 21.8% annually, mainly because of the lower product transport of items such as corn, rice, vegetables, and animal and pork by-products.

In contrast, during these two months, manufacturing products transported from the Llanos Orientales recorded an annual growth of 4.1% due to an increase in tons of goods shipped including palm oil, stone manufacturing, animal fats and oils, cakes, raw wood, and hydraulic cements, which together contributed 15.5 pp to the annual change. However, the flows of manufacturing products from the rest of the country to the region fell by 6.2% annually, largely owing to a lower volume of water, construction products, and animal feed products transported, among others.

### 3. Intermunicipal Passenger Traffic

According to data from the Superintendencia de Transportación on inter-municipal passenger movements provided by the transport terminals, between January 2021 and September 2023, passengers traveling by road to and from the Llanos Orientales accounted for 4.9% of the total flow of passengers in the country. In the third quarter of 2023, this movement recorded an annual drop of 15.6%, both due to the decrease in passenger traffic leaving the Llanos (-15.1%) as well as those entering the region (-7.6%) (Graph B3.5). Notably, the annual monthly change declined in all months of the quarter, reaching -27.6% in September.

Concerning the inter-municipal passenger movement from the Llanos, the decrease is primarily in the flow to the Central region's departments, impacting by -18.5 pp the annual change. Regarding passengers traveling to the Llanos Orientales, the Central and Santanderes regions saw a notable drop, contributing -10.5 pp to the national decrease.

### 4. Tourism

As suggested by various indicators, tourism-related sectors were also significantly affected by the recent Llano road closures, among other factors. Specifically, according to DANE's Monthly Hotel Survey (EMA for its Spanish acronym), which tracks information on the behavior of establishments providing lodging at the national and regional levels, in July and August, the hotel occupancy rate in the region decreased compared to previous months, reaching levels close to those seen at the end of 2021 (around 36.0%) (Graph B3.6). This performance is primarily attributed to a drop in vacation, leisure, and recreation travelers. Real hotel revenues show a similar trend; in July and August, according to the EMA, they presented annual growth rate declines of 17.7% and 25.5% and monthly decreases of 12.3% and 14.2%, respectively. This was accompanied by decreases in the number of workers employed by the industry (Graph B3.7).

### 5. Effects of Closures on GDP

Based on the DANE input-output matrix for 2019, which provides a perspective on the forward and backward linkages of land transport with other productive sectors of the economy, we quantified the effect the recent Llano Orientales road closures potentially had on annual GDP growth during the third quarter of 2023.

Assuming a counterfactual scenario wherein vehicle traffic transiting through the Llano tolls in July and August would not have been affected by the closures and would thus record levels similar to those of June, the annual change of this flow is estimated to present a -14.4 pp decrease attributable to said events. We have also assumed that this impact on vehicle traffic is for the entire third quarter, affecting in equal measure the value added of the land transport segment in the Llanos Orientales.

According to ANI's information, the flow of vehicles transiting through the Llanos tolls represents close to 9.0% of the total national toll traffic. Based on the above, the closures of the roads that connect the Llano with the rest of the country in July and August are found to have had an impact of -0.04 pp on annual GDP change during the third quarter of 2023.

## 6. Conclusions

The recent temporary closures of the main thoroughfare and one of the alternate routes connecting Bogotá and Villavicencio significantly affected land transportation to and from the Llanos Orientales. First and foremost, there was a negative impact on the transportation of goods, particularly agricultural goods. It is plausible to expect the latter may have affected the costs of goods shipped out from the area, although this is not examined in this Box. In addition, the closures affected inter-municipal passenger transport, whose reductions partly explain the drop in real hotel revenues, given the lower flow of tourists visiting the region.

Forecasts of economic activity presented in this Report are constructed using some of the indicators presented in this Box. Accordingly, these findings would point to a decrease in land transport activity in the third quarter of the year, among other factors. Given the forward linkages between transportation and commerce, lodging, and food service activities, a decline in the dynamism of these economic sectors would also be expected. As stated in this Report, this macro sector would actually be the only one in the tertiary sectors to record an annual contraction.

Another calculation -based on the DANE input-output matrix for 2019- leads to conclude that the effect of the Llanos Orientales road closures on the annual growth of national GDP would have been -0.04 pp for the third quarter of 2023.