

Raw Materials

By [Pierre Chancere](#)

Raw materials were vital during the First World War. Due to the armaments production, the belligerents' needs increased significantly, while the available resources fell. Each country intended both to increase its resources and to use them more efficiently. This required broad state intervention that consisted in controlling the needs of domestic populations and administering the distribution of products. Raw materials were also at the core of the Allied cooperation to provide Europe and North America with all necessary supplies. This leads to the question of whether the war led to a change in the global trade of raw materials.

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Introduction

By the time the First World War broke out, the Second Industrial Revolution had greatly increased the industrial output in Western Europe and the [United States](#). These countries' consumption of industrial fuel and raw materials (coal, oil, wood, ore, cotton, wool, leather, etc.) was increasing, and they imported these goods from all over the world. The First World War was an industrial war that demanded large amounts of [weapons](#) and ammunition. As each country attempted to reinforce its armament factories, economic warfare made it increasingly difficult to import raw materials. The new balance between the consumption and the production of raw materials, in addition to [transport](#) difficulties, triggered a general supply crisis. To solve it, the belligerent states set up administrations to control, requisition and deliver raw materials to consumers. The struggle for raw materials between the belligerents also affected the structure of global markets for these products.

A Shortage of Raw Materials

The outbreak of the war shrank the industrial capacity and led to massive devastation and destruction. As early as August 1914, [France](#) was one of the most devastated countries. Following the invasion and [occupation of northern and eastern France](#) by German forces, France lost 14 percent of its industrial output. Before the war, this area produced 75 percent of the French coal production, 81 percent of the iron, 63 percent of the steel, 85 percent of the linen, 94 percent of the wool, and 75 percent of the sugar.^[1] The frontline crossed the coal basin in northern France so that the colliers of Bethune had to work several days and nights under enemy shelling. Likewise, on the [Eastern Front](#), damage from the war contributed to reducing the production of raw materials. In the [Ottoman Empire](#), the Russian bombing of the Ereğli coalmines on the Black Sea added to the mobilization of workers and contributed to decreased production, as many workers left the coalmines to join the army. In 1916, the coal production was 60 percent of its 1913-1914 level and 25 percent in 1918.^[2]

	1913	1914	1915	1916	1917	1918
USA	62,972	42,103	56,415	76,370	76,494	70,773
Germany	28,608	20,505	17,710	?	?	?
Luxembourg	7,333	5,007	6,139	6,752	4,509	?
France	21,918	11,252	620	1,681	2,035	1,672
United Kingdom	16,253	15,105	14,463	13,711	15,083	15,285
Spain	9,862	6,820	5,618	5,857	5,551	?
Russia	9,514	?	?	?	?	?
Sweden	7,476	6,587	6,883	6,986	6,217	?
Italy	603	706	680	947	999	695
Norway	544	652	715	880	?	?
Belgium	150	82	5	30	17	0.5
Algeria	1,349	1,115	819	939	1,065	782
Tunisia	597	248	286	367	606	?
Canada	136	222	361	250	195	188
Japan	172	136	136	159	?	?

Table 1: Ore production (in millions of metric tons)^[3]

	1913	1914	1915	1916	1917	1918
USA	517	466	482	535	591	615
United Kingdom	292	270	257	261	253	231
Germany	277.3	245	235	253	263	261
Austria	43.9	39	38	40.8	-	-
France	40.8	29.8	19.9	21.5	29	26
Russia	33.8	33	28	-	-	-
Belgium	22.8	17	14	17	15	14
Japan	21.4	22	20	23	26	28
British India	16	17	17	17	18	21
Canada	13.6	12	12	13	13	14
Hungary	9.9	9	9	-	-	-
Spain	4.3	4.4	4.7	5.6	6	-
Netherlands	1.9	1.9	2.3	2.7	3.1	3.4
Italy	0.7	0.8	1	1.3	1.7	2
World total	1342	1210	1190	1270	1335	1332

Table 2: Coal and lignite production (in millions of metric tons)^[4]

	1913	1917	1918	1919
USA	33.1	44.7	47.5	54.8
Mexico	3.5	8.3	9.5	12.6
Russia	8.6	9.4	5.5	3.7
Dutch East Indies	1.5	1.8	1.8	2.2
Romania	1.9	0.4	1.2	0.9
British India	1.1	1.08	1.07	1.1
Galicia	1.09	0.8	0.8	0.8
Peru	0.3	0.3	0.3	0.4
Japan and Formosa	0.3	0.4	0.3	0.3
World total	51.6	68.8	70	79.4

Table 3: Oil production (in millions of metric tons)^[5]

	1913	1914	1915	1916	1917	1918
Argentina	9,380	11,432	8,951	1,015	4,976	7,050
USA	4,535	3,952	3,564	3,631	2,328	3,723
British India	5,472	3,883	4,034	4,836	5,344	5,151
Canada	4,455	1,823	2,700	2,098	1,508	1,538
Russia	7,035	4,815	4,856	-	-	-
Austria	155	116	94	85	-	-
Uruguay	245	149	99	31	85	127
Romania	134	39	32	-	-	74
Italy	103	82	82	92	82	120
France	76	85	41	33	40	48
Japan	34	65	78	68	-	165
World total	31,804	26,563	24,676	17,757	20,418	23,874

Table 4: Linseeds production (in thousands of hundredweight)^[6]

The economic war was increasingly linked to the conflict. The main objective was to deprive the belligerent countries of raw materials essential to their war efforts. This strategy was key because the European war economy depended heavily on overseas trade. Between 1911 and 1913, more than 80 percent of the main imports of the industrial western countries ([Great Britain](#), [Germany](#), France and the United States) consisted of raw materials and foodstuffs.^[7]

The Allies increased their [blockade](#) of the Central Powers throughout the war.^[8] Until March 1915, the blockade was restricted and followed the pre-war agreements. Military goods as well as raw materials were declared contraband and could be seized by the enemy fleet. The Allies had no right to control the neutral ports, but they managed to prevent them from trading with the Central Powers thanks to bilateral agreements. As early as September 1914, a Dutch trade association committed itself to limiting commercial exchanges between the Netherlands and Germany. Great Britain signed further agreements with the Danish and [Swedish](#) governments.

From spring 1915 on, the blockade entered an unrestricted phase. The Allies aimed to cut off all maritime transport to and from the enemy countries. They increased their pressure on the neutral countries to prevent them from re-exporting goods to Germany by imposing import quotas for raw materials and foodstuffs. In late 1915, the British government imposed such conditions on the Netherlands, [Switzerland](#) and [Denmark](#), the Central Powers' principal European commercial partners. Specific agreements about some products had been concluded with Norwegian and Swedish trade associations to reduce their exchanges with Germany. Moreover, the British could impose their policy on the [neutral](#) countries by refusing to deliver bunker coal to their vessels. Thus, in a time of fuel scarcity, the English supremacy over the coal resources in Europe helped to increase the Allies' power.

The blockade was implemented to isolate the Central Powers from foodstuffs and raw materials. It was only partly successful and hardly explained their final defeat. The economic collapse of Germany was rather caused by the increasing demands of the [armament industry](#). Nevertheless, the blockade had a deep impact on the whole economy and forced the Germans to do without many raw materials and to develop both a means of rationing and substitute products.

The Allies faced the same problems by the time Germany launched its [submarine war](#).^[9] The first German *U-Boot* attacks started in October 1914. The attacks intensified in autumn 1916, when the average losses of Allied ships increased from 120,000 tons per month in late 1915 to 300,000 one year later. The unrestricted submarine warfare begun on 1 February 1917 constituted a further step. Germany sank on average 600,000 tons per month and up to 885,000 in May. In less than six months, the Allies lost 3.5 million tons. From the summer 1917, the Allied losses decreased, and more and more German submarines were sunk.

Although important, the submarine warfare was not decisive for the fate of the war. The Allies managed to maintain their sea trade thanks to the convoy system and an increase in their shipbuilding capacities. But the economic consequences were severe. The Germans sank 9.5 million tons in the last two years of the war. Not only did this cause a shortage of ships on which all Allied imports depended, but it also disrupted the entire seaborne trade and made the neutral vessels refuse to transport goods for the Allies. As a result, the German submarines made the difficulty of transporting goods the largest economic concern in wartime.

Securing access to vital sources of raw materials became an important [war aim](#). For example, oil shortages led the belligerent countries to secure their supply routes, especially since oil had become a key resource for military ships and merchant fleets.^[10] The Ottoman Empire and the [1917 Russian Revolution](#) prevented Western Europe from importing Russian and Romanian oil. As a result, Great Britain tried to control and exclude German interests from Mesopotamia. Thanks to the [Sykes-Picot Agreement](#) signed in May 1916, Great Britain was promised the best areas and its oil companies, such as Anglo-Persian Oil Company and the Royal Dutch-Schell, kept their rights over the oilfields.

Germany took a different route, invading [Ukraine](#) in February 1918 to chase the Bolsheviks out in order to seize the raw materials it needed, including the coal from the Donetsk Basin.^[11] In August 1918, the German government signed a treaty with Russia, committing itself to protecting Baku from Turkish attacks; in return, Russia granted Germany 25 percent of the Azeri oil.

The lack of coal was particularly severe in continental Europe from the end of 1916.^[12] This was primarily due to transport difficulties. [Railroads](#) were in high demand to transport troops and supply military and civilian needs, so that large amounts of coal remained on the pitheads of the mines. Each country had to cope with specific drawbacks. For instance, Russia had a large supply of coal, but it was extracted in Siberia coalmines, which were far from the consumption centres and made transport difficult. In 1917, revolutionary movements in the Donbass region led to lower levels of coal production. Thus the shortage showed the need for Russian officials to develop new metal and coal basins as well as transport networks in remote regions such as the Caucasus, the Urals, and Siberia.

In Germany, the coal crisis was the first consequence of the saturation of the rail network. Because of the blockade, the ports and the rivers received few imported products. As a result, the entire burden for transporting coal from the Ruhr and Silesia fell on the railway. More goods than in peacetime had to be shipped longer distances between the [Western](#) and Eastern fronts. The location of the factories also contributed to the railway crisis. According to the Hindenburg Programme, the steel production was not confined to one place. Rather, it produced in the Ruhr, was then sent to Berlin to be manufactured into shells before returning to the Ruhr to be completed by adding powder. In autumn 1916, the railway stations became jammed and schedules could no longer be followed. The cold winter worsened the situation in January and February 1917, and traffic was interrupted several times. Consequently, the coalmines could not deliver the necessary output for the rest of the country.

The situation was extremely difficult for countries whose fuel supply depended on importing raw materials. [Italy](#) did not produce coal and encountered major problems since, in 1917, it was able to import only 49 percent of the average of the five years before the war.^[13] France had to import half of its coal by sea from England. Already by 1915, both ports and inner transports were congested. The difficulties became critical in the following year. From July 1916, the military transports needed for the [Battle of the Somme](#) demanded use of all available railways, cutting off the coalmines of Nord and Pas-de-Calais from the rest of the country. The submarine war upset the import of British coal via the Channel and diverted many neutral vessels from the coal traffic between England and France. Additionally, the winter 1916-1917 was the coldest in a decade and further increased the need for coal. As the largest producer in the world, Great Britain had to supply these two countries, but its exports were well below their pre-war level. The neutral countries were also affected by the coal shortage since France and Italy took 60 percent of the British exports in 1916 compared with 30 percent in 1913.^[14]

State Answers: The Development of Raw Materials Administrations

State Administration of Raw Materials

In most belligerent countries, the war plans prepared before the war mostly ignored economic mobilization, in part because it was believed that the war would be short. It was believed that if the war was not quickly won on the battlefield, one of the two sides would run out of ammunition and would have to surrender after a few months. Requisitions were supposed to make sure that all raw materials and finished goods necessary for national defence were available.

To deal with the difficulties arising from a shortage of supplies, the state administered the procurement and rationing of raw materials. The general pattern was similar everywhere and led to the creation of new administrations in charge of taking inventory and distributing the available goods to the industries identified as having priority. In all countries, a larger role was granted to trade organizations in economic and political decisions. However, the respective functions of the civilian populations and the military, of private and public bodies, as well as the degree of centralization were not the same in each country.

Moreover, the chronology and the proportion of products allocated for the civilian populations' needs varied greatly.

Germany

Germany was the first belligerent country to take steps to control the purchase and distribution of raw materials.^[15] In August 1914, [Walther Rathenau \(1867-1922\)](#), administrator of the electric company AEG (*Allgemeine Elektrizitäts-Gesellschaft*), warned the army that the country had no supply program and would shortly experience a lack of munitions. The War Raw Materials Department (*Kriegsrohstoffabteilung* or *KRA*) was set up few days later. This department was led by Rathenau himself, who chose his colleagues as the industrial and financial leaders. They were in charge of controlling the requisitioning and allocating of raw materials needed by the armament industry. This creation was the first step toward total mobilisation for war.

To make sure raw materials were delivered to the firms that needed them, the KRA created twenty-five War Raw Materials Corporations (*Kriegsrohstoffgesellschaften*). Each dealt with specific products such as chemicals, metals, wool, leather, etc., which they had to buy, store, and distribute. They corporations represented the private consumers and thus the industrial interests. The companies fought for the property and control of each of these corporations, since they gave their shareholders advantages and lower prices thanks to state interventions.

The KRA was under the Ministry of War's authority and the power of the army kept increasing throughout the war. In August 1916, the Hindenburg Programme demanded that all available resources be used to increase the armament output. All issues related to the war economy were centralised in the War Office. While preparing the Hindenburg Programme, the War Office had not focused on transports or coal supplies. Therefore, by the end of 1916 the country lacked fuel and trains. In March 1917, a coal commissar was given the charge of allocating coal to every consumer. His powers were quite expansive: although he could not always make the decision to close a factory, he could refuse to send it the coal it needed. In the last year of the war, it appeared that the coal resources would not be sufficient to fulfil all the armament needs nor the civilian and railways ones. The War Office made the decision to prioritize the military requirements.^[16] As a result, the Hindenburg Programme and the coal commissar let no raw materials nor manufactured goods go to the civil population, whose situation worsened until the end of the war.

Austria-Hungary

Austria-Hungary created an organisation very similar to the German one.^[17] Already in 1914, the Ministry of War was granted control over the allocation of raw materials. The economic war organisation reflected the dual structure of the Austrian-Hungarian state. Each of the two countries had its own institutions, which multiplied the number of agencies (*Zentralen*) in charge of supplying raw materials. The first agencies were created in Austria in autumn 1914 to deal with metals and cotton. Hungary created its own agencies in 1915. One difficulty that Austria-Hungary faced was that the share of raw materials allocated to the two Empire's parts was not decided according to economic considerations, but rather in proportion to the ratio of contributions to the common affairs budget. Consequently, whereas Austria had ten or fifteen times more textile production capacities than Hungary and higher levels of productivity, it received only three times more raw materials than Hungary. This meant that a great part of the Austrian capacity was under-utilized. This system largely proved to be a failure and the country had a general shortage at the end of the war.

The Central Powers also helped their allies whose armament industries were almost non-existent. Thus, in autumn 1915 Germany signed an agreement with the Ottoman Empire and [Bulgaria](#) to send weapons and raw materials to them!^[18] Turkey was to receive ore, wool, cotton, leather, wheat and foodstuffs, while Bulgaria was to receive ore, food, and tobacco. However, by the end of the war, this agreement no longer worked efficiently due to transport problems and the limited production capacity in these countries.

United Kingdom

In the United Kingdom, from the end of 1914 on purchase unions, whose commercial methods were similar to those of private businesses, were established. This system was adopted for linen and jute. The government also set up a system for controlling the sea trade by granting shipping licences.^[19] Created in November 1915, the Ship Licensing Committee controlled the requisitioned ships by refusing to grant them licenses when they took part in trade regarded as not vital for the war effort. The

supervision of maritime freight became the main public instrument for controlling imports and exports in the country, as well as the basis of the future inter-Allied organisation.

Another option consisted in letting a group of private buyers use the methods and functions of a ministerial department. A good example of this system is the Control Cotton Board, created by the Board of Trade in June 1917 and which was later described as "unique amongst war controls".^[20] The raw cotton import trade from the United States was strongly damaged by the lack of ships allocated by the Ministry of Shipping, whereas the Egyptian cotton was more easily available in Lancashire. The Board brought representatives of the employers, the workers, the Liverpool merchants, and government officials together and decided on a scheme to cope with the lack of cotton. The factories working with Egyptian raw cotton were asked to pay a levy. This money was then given to other factories that were unable to use all their spindles and looms. Thus, this kind of representative structure proved itself able to impose production restrictions upon a whole branch in order to maintain real competition and avoid large unemployment in Lancashire. Such commercial semi-official organizations had common features with the French consortiums.

France

In France, the function of the Minister of Armaments was limited to providing raw materials to ammunitions factories. However, the distribution of supplies was controlled by the Minister of Trade, [Étienne Clémentel \(1864-1936\)](#), who was in charge of all domestic output.^[21] From June 1916 to September 1918, he created thirteen inter-ministerial committees in charge of wool, diamonds, cotton, leather, paper, chemicals, jute, linen, medicinal plants and hemp, as well as separate committees for steel, copper, zinc, wood and many other products. These committees organized the regulation and distribution of supplies for the country and ensured the best use of them by issuing directives that the consortiums followed. Through this system, the state oversaw the redistribution of raw materials and made sure that prices remained relatively equal in order to limit profits. The state had the transport means and the credit, whereas the industrialists brought their technological and commercial knowledge to the table. The cotton consortium, which all cotton manufacturers subscribed to, was the first to be created, in October 1917. It led all commercial operations related to purchase, import and the sale of raw cotton to supply the cotton industry. In this way, it successfully brought prices down to 20 percent lower than market prices.

The coal supply and the price policy were driven by a specific agency of the Ministry of Armament, the National Bureau of Coals (*Bureau national des Charbons* or *BNC*).^[22] From summer 1917, it controlled the whole French coal market, thanks to its agents in the coal basins and in the maritime ports. All consumers were gathered in groups based on geographical and functional grounds. Every month, each group's leaders had to determine the needs of all members of their groups; they then had to redistribute among them the coal quotas set by the BNC. This particular organisation can be attributed to the strategic importance of coal for the armament industry. Consequently, the industry working for national defence had priority for receiving coal. However, in spite of its military character, the BNC did not neglect civilian needs and helped to avoid a general shortage during the last two years of the war. Moreover, it granted lower prices to the civilian population than to industry.

Russian Empire

The government of Tsarist [Russia](#) created official committees to distribute fuel and raw materials. As was true in other belligerent countries, in Russia coal was also essential in wartime.^[23] The consumption structure changed throughout the war; strategic sectors such as railways, steelworks and engineering factories increased their part of the pie. As a consequence, the non-vital industry lacked coal. A special administration run by the Minister of War, the Special Council for Fuel Supply, dealt with coal. It did not intervene to increase output, but instead tried to improve the distribution of coal. In the second half of 1915, the Special Council requisitioned coal and imposed a maximum sale price; however, this was not successful. In 1916, fuel consumers were ranked according to their importance in the war effort. The Council then established the amount that would be granted to each consumer. From September 1916, state intervention was even stronger in the Donbass region. All coal was bought and sold to consumers at fixed prices by the *Tsentrougol'*, a single body composed of mine-owners and government officials. The connections between businessmen and the administration was strengthened all the more as raw materials became allocated by a state agency.

Russia was rich in ferrous and non-ferrous metals such as copper, lead, and zinc. However, they proved to be difficult to transport, so that the supply of raw material was a subject of concern for Russia as well. Stocks ran short and providers altered

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their contracts to increase the prices. A metal commission was appointed to regulate these markets. The commission directed the goods towards ammunitions factories, while the percentage of metal allocated for railways and construction projects declined. In spring 1916, this commission had to deal with the general shortage of metals and to decide which consumers would be the first to receive goods. Consumers not directly involved in the armament production saw the amount of metal they received fall. The largest companies took advantage of their importance for national defence and their links to the government to receive the raw materials they needed. When the revolution occurred, the railway network was already under pressure and could no longer deliver the fuel and the raw materials that the government had promised the civilian population and companies.

In 1917, the output of raw materials and fuel fell to 70 percent of the pre-war level because of the inefficiency of the industrial war system. When the Bolsheviks came to power, they created a Supreme Council for the National Economy in order to regulate production, supply and prices. It aimed – unsuccessfully – to allocate raw material to the leading industries. By the time the [Treaty of Brest-Litovsk](#) was signed, the industrial output had collapsed.

USA

The United States also implemented a system to regulate raw materials. Shortly after the U.S. entered the war, a special agency was created that was in charge of organizing the economic effort.^[24] The [War Industries Board](#) (WIB) was appointed in July 1917 to coordinate the needs of both the Army and the Navy. Initially it only had a consultative role before becoming a federal body, in March 1918. The WIB settled fifty-seven War Service Committees, which represented all the companies for each trade. It ranked all the industries in order of priority for granting means of transports and raw materials.

The WIB was led by a “dollar-a-year man”, [Bernard Baruch \(1870-1965\)](#), a businessman who worked in finance before the war, a sign of the increasing links between industry and government. The commodity sections were led by managers and members of business interests associations. The industrial sector provided the War Industries Board with men and controlled the information necessary to mobilise the economy. The WIB was lobbied by the largest industries, which were eager to retain the favourable economic conditions. Several historians have shown that this administration was unable to establish an economic program on its own, but needed the industrial sector’s help in doing so.

Several conclusions can be drawn from this brief account. First of all, the shortage of raw materials forced governments to find new means of regulation, such as setting priorities that benefited the largest companies. Germany and the United States gave large economic powers to the state as soon as they entered the war, whereas in Great Britain and France state control remained quite restricted until 1917. Industrialists became more involved in the economic policy of wartime. This new and larger role given to companies required spokesmen to work with the state. Thus, the First World War contributed to altering the industrial structure by developing the business interest associations.

At the beginning of the war, the state aimed to allocate raw materials in order to maximise the output for the war effort. States were eager to regulate the competition between producers and to limit profits by controlling prices. In some cases, as was true in France, the ministers would have liked to maintain these economic organisations in peacetime, since the collaboration between the state and companies had been considered an efficient way to modernise the national economy and to increase productivity. The belligerent states had created large administrations to control the needs, allocation, and the use of raw materials. These administrations had great power and could essentially decide the state’s economic policy. They generally employed “unbureaucratic bureaucrats”,^[25] or “temporary civil servants”,^[26] that is to say men from many trades useful because of their specific technical and commercial skills.

The structure and priorities of these new agencies followed two patterns. They were under the authority of either the Minister of War (as in Germany and Russia), or a civilian ministry (as in France and the United States). Civilian needs were everywhere curtailed, as states prioritized military requirements. The Central Powers and to some extent Russia allocated all products to the armament factories and the army, sacrificing their civilians in the process. This choice turned out to be disastrous to the war effort, as it led to social unrest. In contrast, the Allies, relying on their maritime superiority, managed to supply civilians with raw materials.

Finally, one can remark that all main belligerent countries (Germany, Great Britain, France and Russia) created an agency to regulate the coal market. This can be explained by the fact that coal was necessary for the industrial output, for transports as well as for civilians. Consequently, these bodies had to arbitrate between all the consumers and had great economic power.

Thus their choices were clues to understanding to what extent governments chose to sacrifice their civilian populations for the war effort.

International Cooperation

The economic difficulties obliged the Allied governments to cooperate in order to improve their supply capacities.^[27] As early as August 1914, France and Great Britain had set up a *Commission internationale du Ravitaillement* (International Commission of Supplying), which centralised the purchased of supplies for the Allies. Many committees of this kind were created. These were purely purchasing agencies for the Allied governments; they did not regulate prices or credit, or focus on streamlining the available means of transport. The difficulties of the maritime transport, more complicated from autumn 1916 on, and the bad crop season in the summer of 1916, led the Allied governments to strengthen their economic cooperation in order to prioritize certain supplies. Thus, the Wheat Executive was established on 27 November 1916. It determined the needs of each Allied country, and the purchasing and sharing of grains at a specific price. This organisation avoided high prices and rationalized the maritime transports. Specific agreements were signed to increase British exports of coal to France and Italy. On 1 June 1916 the Board of Trade limited the prices of coal and maritime freight. The *Bureau national des Charbons* centralised the imports and sent them to a British Coal Controller, who delivered them to the collier districts and ship-owners. The coal vessels were then told in which port they should load and unload their shipments. As the historian [Georges-Henri Soutou](#) wrote: "Within the summer 1917, the problem of raw materials came at the first plan of the Allied concerns."^[28]

For the [French government](#), there were many benefits to be gained from a closer economic cooperation with Great Britain.^[29] That is why in August 1917 Étienne Clémentel proposed creating an inter-Allied body for the control of raw materials on the pattern of the Wheat Executive. The idea had been discussed during the Paris Economic Conference in June 1916 when the Allies had decided to reinforce their collaboration in the field of raw materials in order to improve their distribution among the Allies and to prevent enemy countries from using them. Such an organisation would have allowed French officials to participate in decisions instead of being dependant on England, which had both the raw materials and the means of transport. Since the failure of the Nivelle Offensive in May 1917, the British government had also been convinced of the importance of economic factors for winning the war.

However, not all Allied governments shared the same view. Whereas Great Britain and the United States were only interested in a wartime collaboration, France was eager to maintain the inter-Allied economic bodies after the war. The Allies also faced organisational problems. For all these reasons, the economic cooperation in the field of raw materials remained limited. In August 1917 the Allies created the Meats and Fats Executive, but the Oil Seeds Executive was not created before spring 1918.

The coordination of shipping was the greatest success of the inter-Allied cooperation. In November 1917, each Allied country committed to limiting their imports. In return, Great Britain agreed to create a pool of ships. The Allied Maritime Transport Committee (AMTC) composed of the four Allied ministers of trade (United Kingdom, United States, France and Italy) decided how to use these ships and a new administration was established to provide statistics. Despite political and organizational difficulties, in 1918 the AMTC prepared a general program of transportation, taking into account the needs for raw materials and the available possibilities for shipping.

Thus, the inter-Allied cooperation for raw materials was necessary both to weaken the Central Powers and to supply the Allies during a period of scarcity of credit and means of transport. But it was broken up as soon as the war ended, as each country had diverging interests. France was dependant on Great Britain and the United States for shipping and raw materials. These two countries refused to lose their economic advantages in order to protect their export markets in peacetime.

Substitute Products and Domestic Production

The belligerents replaced lacking raw materials with "ersatz" (replacement) products. By the end of the war, the Germans had to wear shoes and use soap of very poor quality.^[30] But the chronic shortages also led to several technological advances. For example, a British firm managed to produce potassium from blast furnace residue as a substitute for German potash. Another company replaced barium with a selective native carbonate in the form of whiterite.^[31] Because of the increasing difficulties of importing Chilean nitrates, the [British government](#) helped to create oxidation of ammonium factories to make ammonium nitrate essential for sulphuric acid.^[32] The Haber-Bosh process to synthesize ammoniac, invented in 1910 in Germany, took advantage

of the lack of nitrate in Europe.

The war showed how dependant France^[33] and Russia^[34] were on foreign coal and contributed to these countries' goals of building hydroelectric power plants and developing long-distance electricity transport that were fulfilled in peacetime. These two countries developed domestic output by intensifying the production of secondary basins, as well as by harnessing new coalfields, like in the Moscow basin, the Urals and Siberia in Russia, or in Massif Central in France. Everywhere, the lack of coal obliged people to use wood, oil and peat instead. Germany encouraged the recycling and harnessing of low-rented basins, like phosphate-poor ores in the district of Lahn-Dill in Thuringia and in the Harz, molybdenum in Werdenfels, wolfram in Saxony, and graphite in Passau.^[35] In Austria the abandoned mines of zinc, stain, lead and copper were reopened.^[36]

Germany also requisitioned resources from the countries it invaded. Germany removed the wood stocks in Poland and oil in Romania.^[37] In occupied France, the factories were taken over and the German army seized the finished goods and raw materials.^[38] A special service, the *Schutzverwaltung*, was in charge of requisitioning all industrial supplies. The timber from the forests in occupied France were used to build the trenches; it was also sent to Germany. The Germans also took civilians' goods. Thus woollen products, such as mattresses and pillows, were requisitioned. From the end of 1916, they took all the metal that could be melted down and reused for the armament industry: copper, nickel, stain, brass, bronze, etc. The civilians in conquered territory had to gather all their metal objects. Church bells were the most desired. This led to a conflict with the Catholic Church in Belgium. The policy of taking raw materials in the occupied areas was aimed at both increasing the industrial production capacity of Germany and weakening the enemies' economies so that they were no longer competitors after the war.

Warfare and Global Markets of Raw Materials

The war altered the structure of global trade and led to a "decentralization of the international economy"^[39] Before 1914, Europe and North America were the industrial leaders that made the highest added-value products, whereas the other continents supplied them with cheap raw materials. This "centre-periphery" pattern changed during the war. The United States, Eastern Asia, and the dominions witnessed a broad industrial growth at the detriment of Western Europe. The European countries imported more manufactured goods and saw their raw material import levels fall by half.

A study of the aftermath of the war in Latin America shows how the conflict affected the raw material exports.^[40] The war's effects on the economy of Latin America were ambivalent. The war demonstrated the high degree of dependency on overseas trade and foreign fleets in the area, especially in countries that specialized in a single type of export. Thus, before the war, three-quarters of Mexico's exports were of ore (gold, silver, lead and copper). The same proportion of the Chilean exports was of nitrates. Brazil's main export was coffee, but rubber represented more than a quarter of its total exports. Other Latin American countries had more diversified exports: Argentina sold linen, hides and wool, while Peru sold raw cotton, copper, oil and rubber.

Already at the end of 1914, the collapse of international finance, the lack of ships, and the blockade of the Central Powers triggered a halting of international sales. As a result, prices fell. All countries' foreign trade was disrupted, although Chile's trade was damaged the least.^[41] Nitrate prices fell down from 8 s per quintal in July 1914 to 6 s 4 d in September and 5 s 8 d in February 1915. In the last five months of 1913, 29 million quintal had been exported, as opposed to 9.5 million in the same period in 1914. This product was usually used to make fertilizers – not the highest priority for belligerent countries during the war. The Chilean copper exports were even more affected, because large stocks had been made in the United States before the war, which contributed to a sharp decrease in prices, due to diminished demand. A further example is the cotton trade. Due to the increase of transportation costs by 300 percent, the producers found it harder to see the products.

Beginning in 1915, the international economic situation favoured Latin America. Admittedly, the blockade isolated the continent from Germany, a country that had imported 24 percent of Chilean nitrates. But, except for coffee, all the products from South America were widely needed by the Allies. In particular, the Chilean nitrates were used to make explosives in Western Europe and in the United States. Output reached an unprecedented level and prices rose until the end of the war. The restoration of trade between South America and Europe after the war allowed Chilean and Peruvian exporters to earn more money. However, this occurred to the detriment of local industry, which remained badly developed. Had shipping and a larger workforce been available, the export of raw materials would probably have increased even more.

Except for the first months of the conflict, the First World War benefited Latin America. Nevertheless, the increase of raw

material exports from this continent was of short duration and was due to the exceptional circumstances of the war. The huge purchases made by Western Europe and the United States did not continue in peacetime. As a result, the war reinforced the industrialized countries' dominance of those countries supplying raw materials. Although local industry spread throughout the war, this development proved limited because South American producers could not compete with the imported manufactured goods in the long-term.^[42]

Far East Asia, in contrast, had a different outcome. Here, Europe's decline helped industry to develop at an unprecedented scale, especially in Japan. The exports of raw materials also increased in order to supply new industries.^[43] Both industry and exports boomed in China. Forced sales to Japan made cotton the leading sector there. The exports of silk, tea, wool, hides and leather, vegetal oil, ore and coal also rose significantly, thanks to Japanese investments and a scarcity of European goods. Prior to 1914 India had also been a provider of raw materials. The war closed the traditional markets for India's main products, such as cotton, jute, and rubber. But it created a demand for other goods like manufactured jute goods, wolfram, mica, saltpetre, timber and other raw materials. The growth of the cotton industry was somewhat illusionary, as increases in production were not based upon innovations in output methods but were due to a larger workforce. In addition, the Indian sales were threatened by the Japanese products.

The industrial war had many effects on the raw material producers, although most of them were neutral. The large European needs were not necessarily a good opportunity for the rest of the world. Admittedly, they could sell their raw materials at higher prices. But this was of short duration. As soon as the war ended, their exports returned to their pre-war levels, again demonstrating that they remained dependent on the industrial countries.

Conclusion

During the First World War there was a scarcity of raw materials. This scarcity altered consumption habits, both for industry and for civilians. This situation obliged consumers to deal with shortages and ersatz products, but it also led them to focus on the uses and purchase conditions. Everywhere, the general scarcity led to regulation and the increasing intervention by the state, since it was the only institution that seemed capable of allocating raw materials.

The allocation of raw materials constituted an international issue. The use of raw materials was a problem for all belligerent countries and was at the centre of military strategy. Everywhere, officials and armies had to find solutions to provide materials for armament factories in order not to lose the war. But the supply of raw materials became an economic weapon too and one of the economic aims of both sides.

Raw materials constituted a key aspect of the industrial powers' economic domination of the other continents before the war. During the war, this situation was altered but not reversed. The exchange conditions became more favourable for the providers of raw materials only because the belligerents were temporarily weakened. The example of Latin America shows that their improved situation was not due to a durable economic development. However, for Japan the post-war period demonstrated that the structure of the global raw materials market remained as it had been prior to 1914.

Pierre Chancelerel, Institut national du Patrimoine

Section Editor: [Michael Geyer](#)

Notes

1. ↑ Duroselle, Jean-Baptiste: *La Grande Guerre des Français*, Paris 1994, p. 171.
2. ↑ Pamuk, Sevket: *The Ottoman Economy in World War One*, in: Broadberry, Stephen / Harrison, Mark (eds.): *The Economics of World War I*, Cambridge 2005, p. 119.
3. ↑ League of the Nations: *Report on the problem of raw materials and foodstuffs*, Geneva, League of Nations, 1922, p. 164.
4. ↑ *Ibid*, p. 191.
5. ↑ *Ibid*, p. 211.

6. ↑ International Institute of Agriculture: *International Year Book of Agricultural Statistics, 1917-1918* Rome, International Institute of Agriculture, 1920, pp. 142-143.
7. ↑ Hardach, Gerd: *The First World War. 1914-1918*, London 1977, p. 5-6.
8. ↑ *Ibid.*, pp. 13-34. See also: Siney, Marion C.: *The Allied Blockade of Germany, 1914-1916*, Ann Arbor, MI 1957; Farrar, Marjorie Milbank: *Conflict and Compromise. The Strategy, Politics and Diplomacy of the French Blockade, 1914-1918*, The Hague 1974; Vincent, Charles Paul: *The Politics of Hunger. The Allied Blockade of Germany, 1915-1919*, Athens, OH 1985.
9. ↑ Masson, Philippe: *La Guerre Sous-marine*, in : Audoin-Rouzeau, Stéphane / Becker, Jean-Jacques (eds.): *Encyclopédie de la Grande Guerre*, vol. 1, Paris 2012, pp. 565-581.
10. ↑ Soutou, Georges-Henri: *L'Or et le Sang. Les Buts de Guerre Économiques de la Première Guerre Mondiale*, Paris 1989, pp. 211-213.
11. ↑ *Ibid.*, pp. 690-708.
12. ↑ Feldman, Gerald Donald: *Army, Industry and Labor in Germany, 1914-1918*, Princeton 1966, pp. 253 ff; Gatrell, Peter: *Russia's First World War. A Social and Economic History*, Harlow 2005, pp. 96-97, 109-110; Chancerel, Pierre, *Le Marché du charbon en France pendant la Première Guerre mondiale*, Ph. D., Université Paris Ouest, 2012, pp. 61-108.
13. ↑ Wrigley, Chris: *The War and the International Economy*, in: Wrigley, Chris (ed.): *The First World War and the International Economy*, Cheltenham 2000, p. 8
14. ↑ Supple, Barry: *The History of the British Coal Industry*, vol. 4, 1913-1946. *The Political Economy of Decline*, Oxford 1987, pp. 86-88.
15. ↑ Feldman, Army 1966, pp. 45-52; Hardach, *The First World War* 1977, pp. 55-62.
16. ↑ Feldman, Army 1966, pp. 281-282.
17. ↑ Schulze, Max-Stephen: *Austria-Hungary's Economy in World War I*, in: Broadberry, Stephen / Harrison, Mark (eds.): *The Economics of World War I*, Cambridge 2005, pp. 86-87.
18. ↑ Hardach, *The First World War* 1977, pp. 75-77.
19. ↑ Salter, James Arthur: *Allied Shipping Control, an Experiment in International Administration*, Oxford 1921; Fayle, Ernest Charles, *Seaborne trade*, 3 vol., London 1920-1924.
20. ↑ Henderson, Hubert Douglas: *The Control Cotton Board*, Oxford 1922, p. 12. See also: Fowler, Alan: *The Impact of the First World War on the Lancashire Cotton Industry and its Workers*, in: Wrigley, *The First World War* 2000, pp. 76-98.
21. ↑ Godfrey, John Ferguson: *Capitalism at War, Industrial Policy and Bureaucracy in France (1914-1918)*, New-York 1987, pp. 102-143.
22. ↑ Chancerel, *Le Marché* 2012.
23. ↑ Gatrell, *Russia's First World War* 2005, pp. 108-112.
24. ↑ For a presentation of the supply of each product, see: Baruch, Bernard Mannes: *American Industry in the War. A Report of the War Industries Board*, Washington 1921. For general and more recent developments, see: Cuff, Robert Dennis: *The War Industries Board. Business Government Relations during World War I*, Baltimore/London 1973; Koistinen, Paul A. C.: *Mobilizing for Modern War. The Political Economy of American Warfare, 1865-1919*, Lawrence, KS 1997.
25. ↑ Godfrey, *Capitalism at War* 1987, p. 104.
26. ↑ Bock Fabienne: "Des fonctionnaires temporaires" durant la Grande Guerre, in: Baruch, Marc-Olivier / Duclert, Vincent (eds.): *Serviteurs de l'État. Une Histoire Politique de L'Administration Française, 1875-1945*, Paris 2000, pp. 417-426.
27. ↑ Clémentel, Etienne: *La France et la Politique Économique Interalliée*, Paris / New Haven 1931; Salter: *Allied Shipping Control 1921*; Soutou, *L'Or et le Sang* 1989.
28. ↑ Soutou, *L'Or et le Sang* 1989, p. 478.
29. ↑ *Ibid.*, pp. 233-271 and 478-568.
30. ↑ Feldman, Army 1966, p. 159.
31. ↑ MacLeod, Kay / MacLeod, Roy: *War and Economic Development. Government and the Optical Industry in Britain, 1914-1918*, in: Winter, Jay Murray (ed.): *War and Economic Development. Essays in Memory of David Joslin*, Cambridge p. 181.
32. ↑ Couyoumdjian, Juan Ricardo: *Chile y Gran Bretaña Durante la Primera Guerra Mundial*, Santiago de Chile 1986, p. 123.
33. ↑ Blanchard, Raoul: *Les Forces Hydro-électriques Pendant la Guerre*, Paris 1925.
34. ↑ Gatrell, *Russia's First World War* 2005, p. 110.
35. ↑ Zilch, Reinhold: *Raw Materials, Rationing and Procurement*, in: Brill's *Encyclopedia of the First World War*, Leiden/Boston 2012, p. 847.
36. ↑ Schulze, *Austria-Hungary's Economy* 2005, pp. 86-87.
37. ↑ *Ibid.*
38. ↑ Nivet, Philippe: *La France Occupée. 1914-1918*, Paris 2011, pp. 92-107.
39. ↑ Hardach, *The First World War* 1977, p. 249.

40. ↑ Albert, Bill / Henderson, Paul: Latin America and the Great War. A Preliminary Survey of Development in Chile, Peru, Argentina and Brazil, in: World Development, 9, 8 (1981), pp. 717-734; Albert, Bill: South America and the First World War. The Impact of the War on Brazil, Argentina, Peru and Chile, Cambridge et. al.1988; Hardach, The First World War 1977, pp. 266-273.
41. ↑ Couyoumdjian, Chile y Gran Bretaña 1986, pp. 77-80 and 115-123.
42. ↑ Some historians saw in the First World War the beginning of an economic modernization in Latin America. But it now seems that this industrial take off was rather punctual and did not last in long term. Chris Wrigley summarized this historiographic debate in: Wrigley, The War 2000, pp. 4-5.
43. ↑ Hardach, The First World War 1977, pp. 258-266.

Selected Bibliography

Albert, Bill: **South America and the First World War. The impact of the war on Brazil, Argentina, Peru, and Chile** Cambridge; New York 1988: Cambridge University Press.

Broadberry, Stephen N. / Harrison, Mark (eds.): **The economics of World War I**, Cambridge; New York 2005: Cambridge University Press.

Clémentel, Etienne: **La France et la politique économique interalliée**, Paris; New Haven 1931: Les Presses universitaires de France; Yale University Press.

Feldman, Gerald D.: **Army, industry, and labor in Germany, 1914-1918** Princeton 1966: Princeton University Press.

Gatrell, Peter: **Russia's First World War. A social and economic history**, Harlow 2005: Pearson/Longman.

Godfrey, John F.: **Capitalism at war. Industrial policy and bureaucracy in France, 1914-1918** New York 1987: Berg; St. Martin's Press.

Goebel, Otto Heinrich: **Deutsche Rohstoffwirtschaft im Weltkrieg einschliesslich des Hindenburg-Programms**, Stuttgart; Berlin; New Haven 1930: Deutsche Verlagsanstalt; Yale University Press.

Hardach, Gerd: **The First World War, 1914-1918**, Harmondsworth 1987: Penguin Books.

Hippelheuser, Richard H. / Baruch, Bernard M.: **American industry in the war. A report of the War Industries Board (March 1921)**, New York 1941: Prentice-Hall Inc..

Koistinen, Paul A. C.: **Mobilizing for modern war. The political economy of American warfare, 1865-1919** Lawrence 1997: University Press of Kansas.

League of Nations (ed.) / Gini, Corrado / Vinci, Felice: Report on the problem of raw materials and foodstuffs, Geneva 1921: A. Kundig

Redmayne, Richard Augustine Studdert: **The British coal-mining industry during the war**, Oxford; London; New York 1923: Clarendon Press; H. Milford.

Salter, Arthur: **Allied shipping control. An experiment in international administration**, Oxford; London; New York 1921: Clarendon Press; H. Milford.

Soutou, Georges-Henri: **L'or et le sang. Les buts de guerre économiques de la première guerre mondiale** Nouvelles études historiques, Paris 1989: Fayard.

Staley, Eugene / Knorr, Klaus: **Raw-material problems and policies**, Geneva 1946: League of Nations.

Wrigley, Chris: **The First World War and the international economy** Cheltenham 2001: Edward Elgar.

Zilch, Reinhold: **Raw materials, rationing and procurement**, in: Hirschfeld, Gerhard / Krumeich, Gerd / Renz, Irina (eds.): Brill's encyclopedia of the First World War, Leiden; Boston 2012: Brill, pp. 845-848.

Citation

Chancerel, Pierre: Raw Materials , in: 1914-1918-online. International Encyclopedia of the First World War, ed. by Ute Daniel, Peter Gatrell, Oliver Janz, Heather Jones, Jennifer Keene, Alan Kramer, and Bill Nasson, issued by Freie Universität Berlin, Berlin 2015-07-16. DOI: [10.15463/ie1418.10686](https://doi.org/10.15463/ie1418.10686).

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