

# Azerbaijan 2030: A Vision of the Future

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In 2012, the development concept “Azerbaijan 2020: A Vision of the Future” was ratified. In terms of economic development 8 years is a medium term, but almost none of the stated goals have been achieved. For example, Azerbaijan’s gross domestic product (GDP) is currently 30% lower than in 2012. Although there has been marginal progress in terms of diversification, it was “achieved” partly by altering some of the statistical definitions (i.e. designating some petrochemical processing sectors as non-oil). Looking toward the future from 2020, the Azerbaijani economy faces two major risks: a sharp decline in oil revenues (in the long term) and the impact of climate change on the post-oil economy. In this essay, we will attempt to answer two questions – what difficulties will the consequences of oil dependence create against the backdrop of climate change for the development of the post-oil economy, and what long-term strategy is needed to overcome these difficulties.

The rapid depreciation of oil and the sharp decline in oil revenues in the long term threaten Azerbaijan’s economic development in the coming decades. In order to manage the consequences of the post-oil economic downturn, a priority sector for development in Azerbaijan should be agriculture. However, agriculture (as well as tourism) will face a number of impacts of climate change in the coming decades which threaten the sustainable development of those sectors. The Azerbaijani government has been slow to begin to manage these two risks, which pose a fundamental threat to the country’s long-term development, and the measures taken so far have been chaotic and lack any strategy. In order to eliminate the economic and social consequences of these factors, a long-term development strategy must be developed that takes into account

a number of features of the Azerbaijani economy which are typical of oil-dependent economies. The government should pursue a policy assuming the worst-case scenario, which is what is most likely to occur.

To support my claims, we will first explain the coming decline in oil revenues, and then describe a set of economic and institutional conditions brought about by oil dependence. In the third section, we will show why agriculture should become a priority sector against the backdrop of a long-term decline in oil revenues. In the fourth section, we will identify the effects of the projected consequences of climate change on priority sectors such as agriculture (as well as tourism). In the fifth section, we will discuss the difficulties that dependence on crude oil exports creates for the adaptations needed to overcome these effects, and in the sixth part, I will focus on the development strategy that the Azerbaijani government has implemented, and that which it should have implemented, to overcome these difficulties.

This is an essay in the field of political economy, not a policy paper. Statistical data and academic sources were used in writing it. As we are not an agricultural or climate specialist, the information we provide in these fields is based on academic research. In this essay, the terms “state” and “government” are used interchangeably and have the same meaning.

## **Oil dependence and declining revenues**

Azerbaijan’s economy faces a number of challenges in terms of the long-term production of goods and services.

First of all, oil revenues are declining. It is inevitable that oil production, which accounts for the bulk of economic growth as well as exports – and, consequently, projected revenues – will gradually decline over the next 20 years.<sup>[\[1\]](#)</sup>

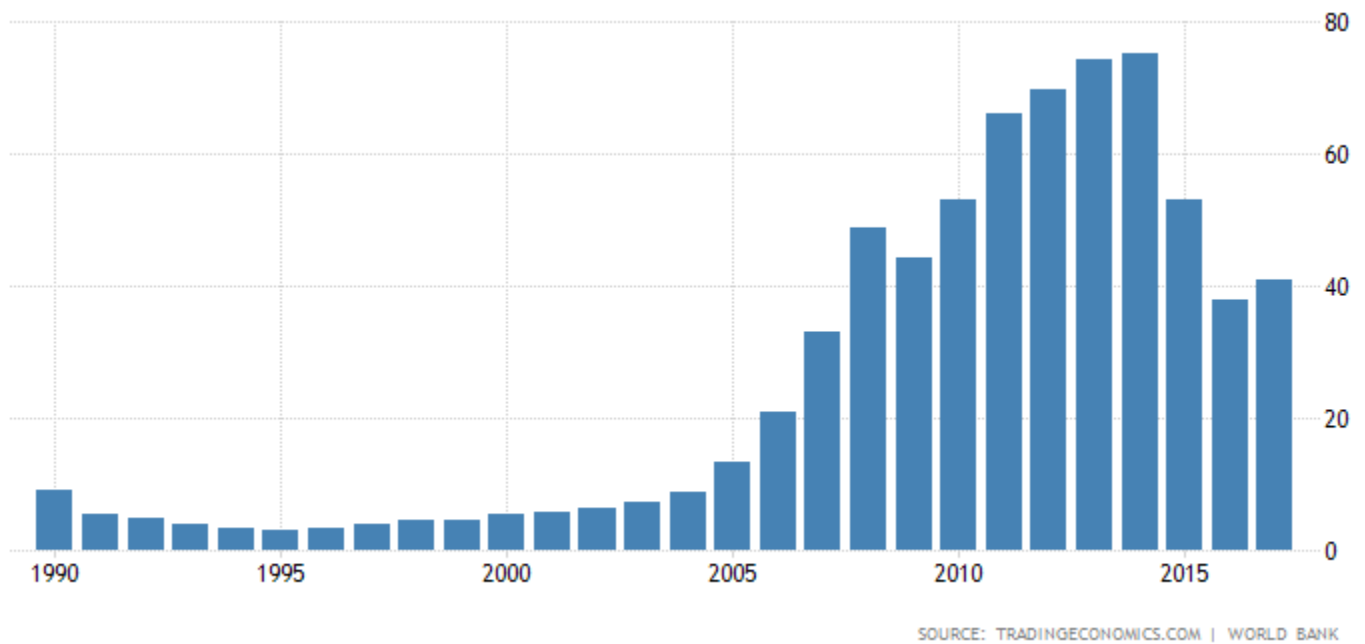
Looking at Figure 1, we see the annual economic growth rate in

Azerbaijan from 2011 to this year. The trend shows that the GDP growth rate has been declining since 2010, and given the oil price forecasts<sup>[2]</sup> and the fact that oil production in Azerbaijan has been declining from year to year,<sup>[3]</sup> it is safe to say that the economic growth which occurred between 2006 and 2008 will not be repeated.



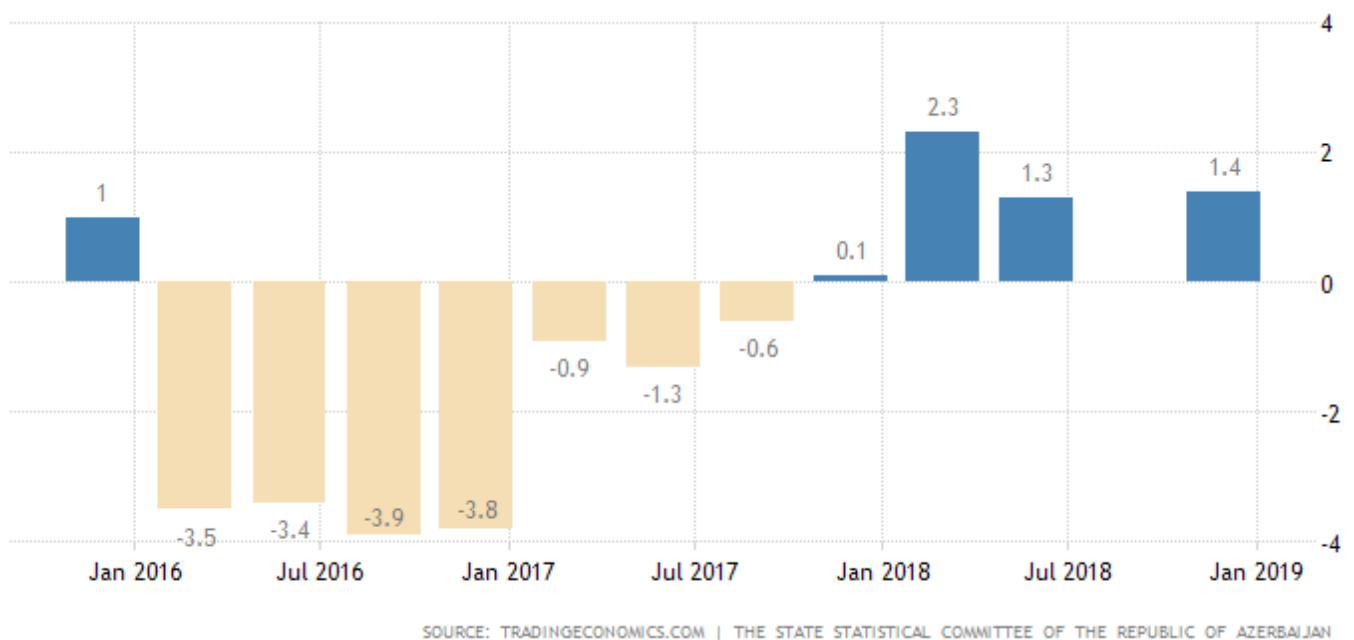
**Figure 1: Economic growth, in percentages, compared to each previous year**

If we look at the overall annual GDP (Figure 2), it becomes clear that this trend confirms the end of a period unprecedented in the history of Azerbaijan's market economy. As we can see, annual GDP, close to 70 billion USD in 2015, has fallen to around 40 billion USD since then.



**Figure 2: Annual GDP growth rate**

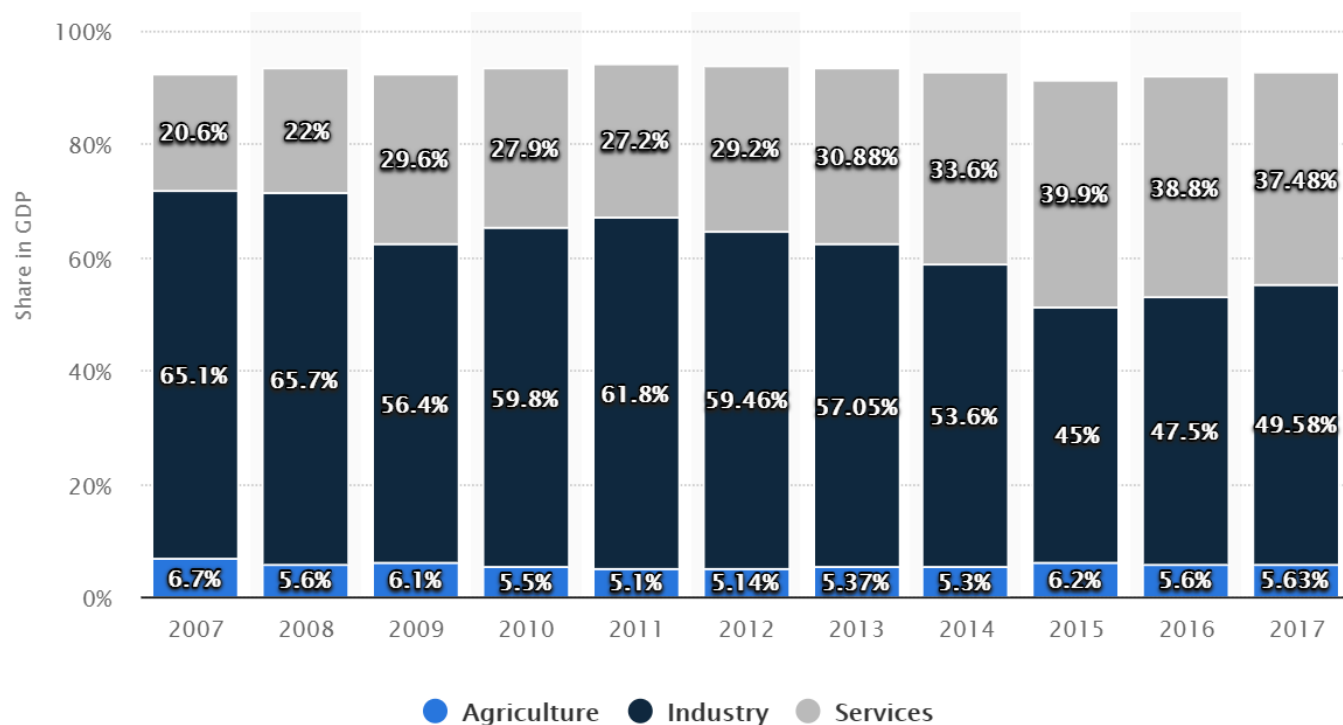
This decline has occurred because oil prices have more than halved since 2014. To better understand the effects which this has brought about, let's look at Figure 3.



**Figure 3: Quarterly economic growth in 2016-2019, in percentages, compared to the previous year.**

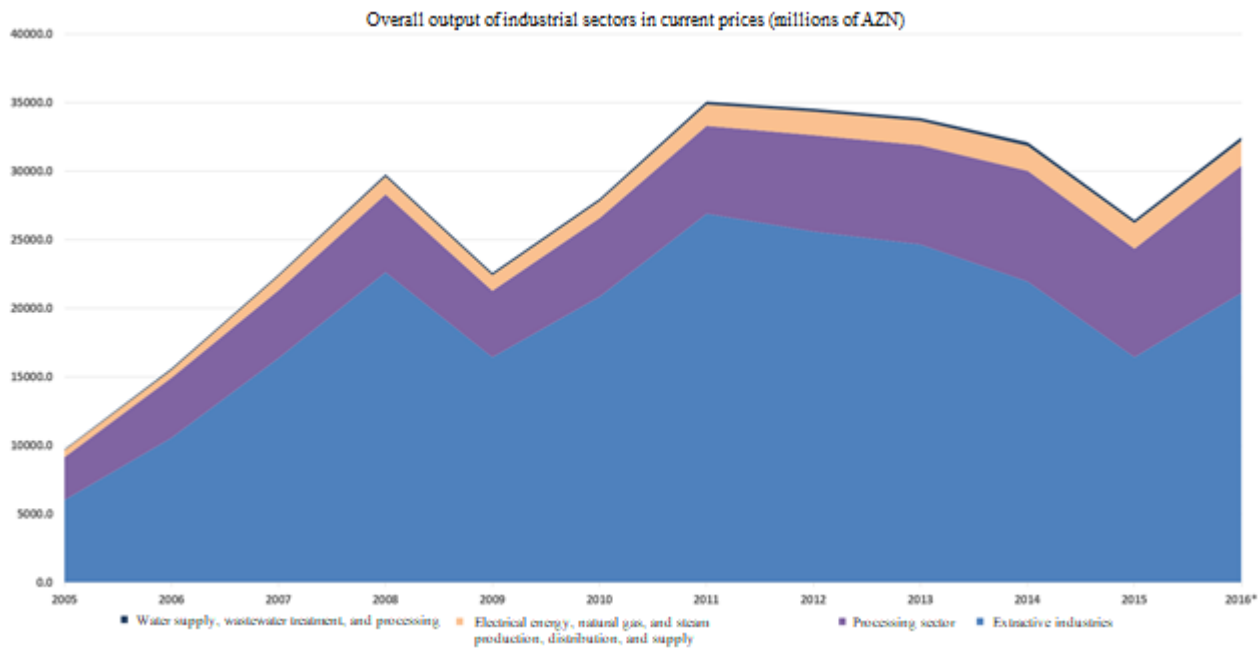
As seen here, for the entire duration of this three-year period the nominal growth (including inflation) of the Azerbaijani economy remained below 3%, which is considered

necessary for the healthy development of a market economy. But why did the decline in oil prices have such a severe impact on the decline in Azerbaijan's GDP? To understand the answer to this question, we must look at the degree to which Azerbaijan's economy is dependent on oil prices. Figure 4 should be helpful.



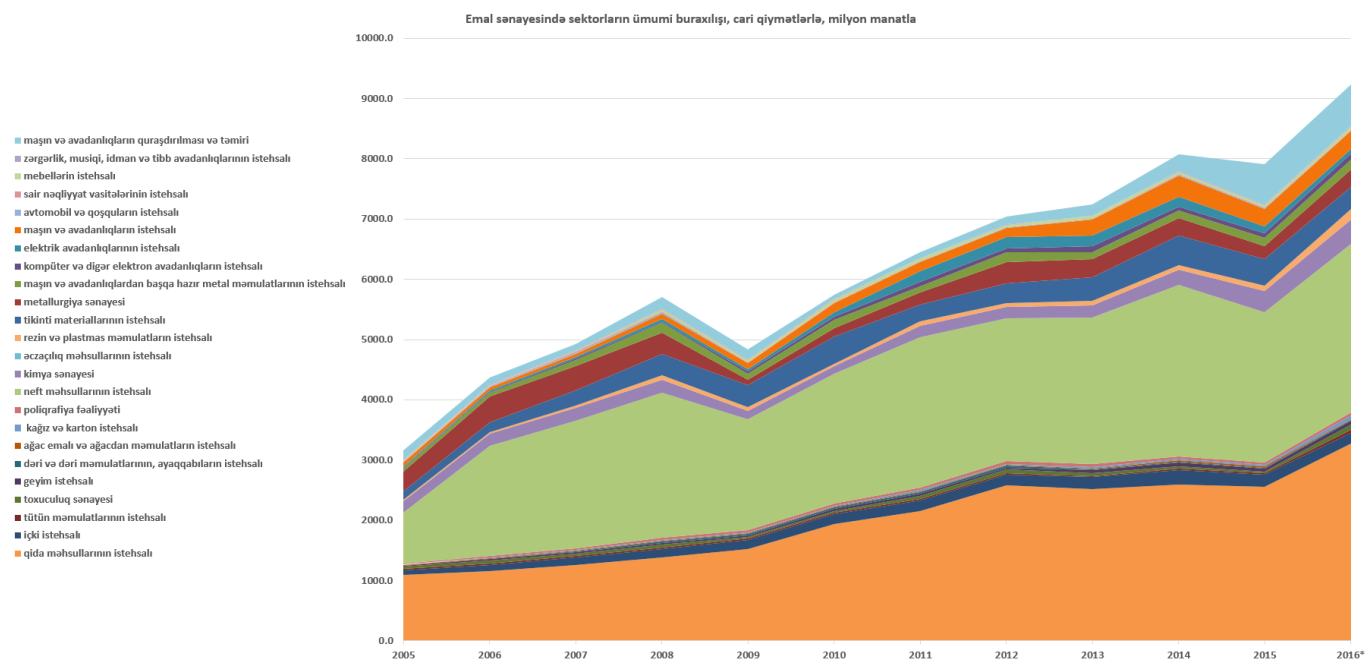
**Figure 4: Composition of GDP**

As can be seen from the graph, although the share of the service sector in GDP has increased somewhat over the past 10 years, in general the agricultural sector has remained at 5-6%, industry at 40-60% and the service sector at 20-30%. At first glance, this would seem to be a normal structuring of GDP. To understand why the economy reacts so sharply to the effects of foreign markets, we need to look at the composition of primary components of GDP – the industrial and service sectors.



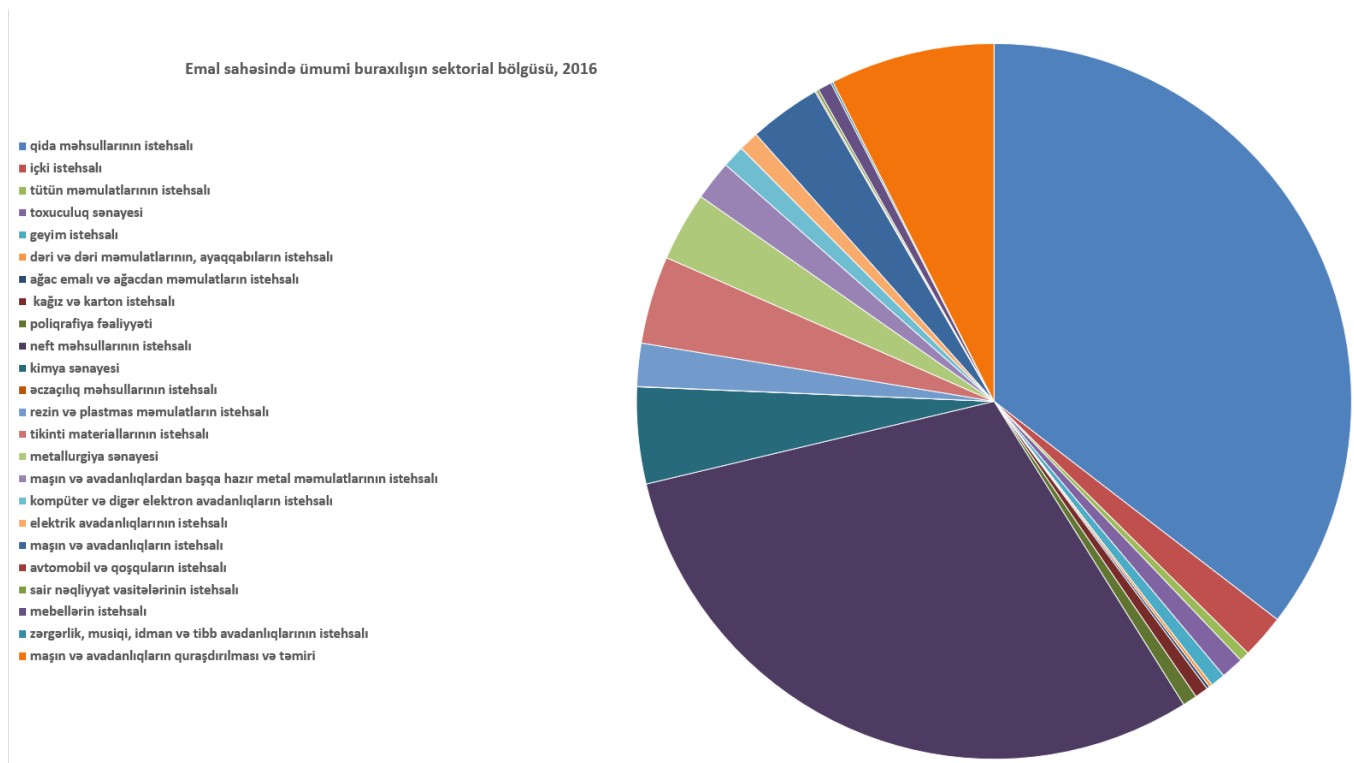
**Figure 5: Total industrial output, at current prices**

Figure 5 shows the breakdown of industrial production by GDP for 2005-2016 in Azerbaijani manats (AZN). The part in blue represents extractive industries, including the production of oil, natural gas, and a certain amount of crude metal. The yellow area represents the value derived from electricity generation, natural gas production, and energy distribution, which are directly related to the oil and gas sector. The purple area indicates the value produced in the processing industry for the same period. Since the processing industry is a general term, it would be useful to look at a breakdown of this industry as well. If we look at the structure of the refining industry for the same years in Figure 6, we see that the two largest sectors are petroleum products (green) and food production (orange), both of which grew as Azerbaijan's oil-dependent economy developed.



**Figure 6<sup>[4]</sup>: Annual total sectoral output in the processing industry, in millions of AZN**

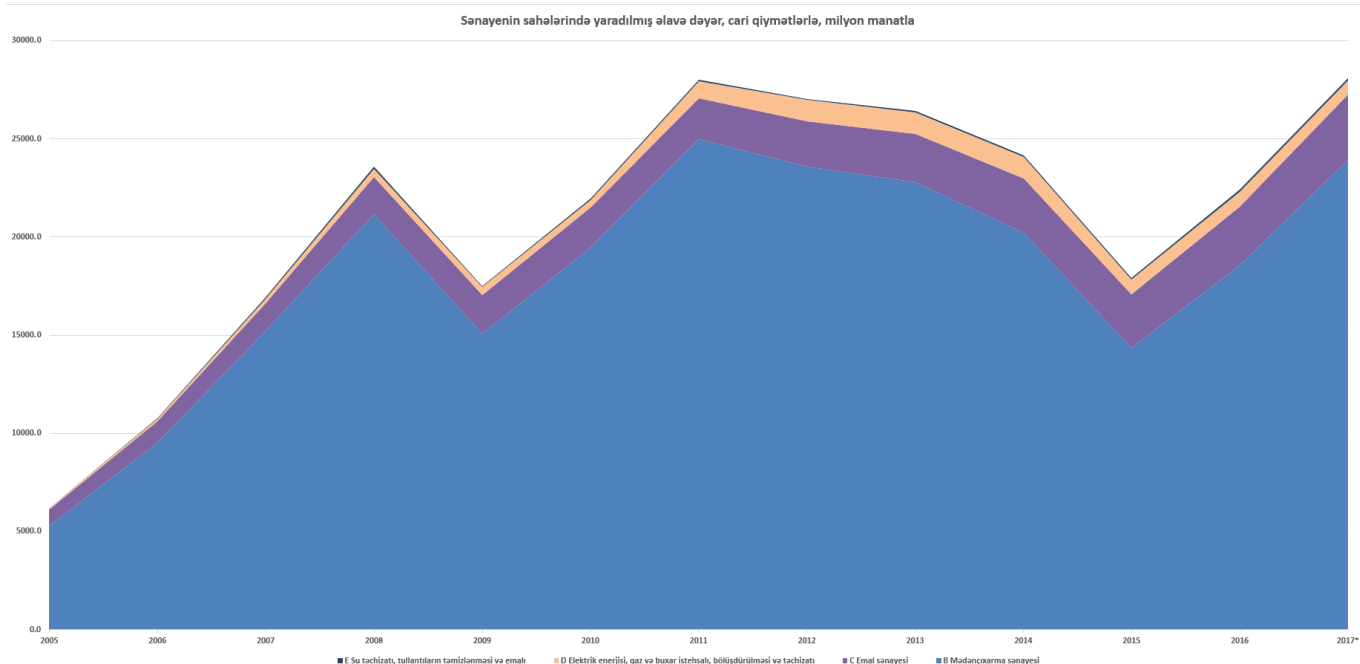
To get a clearer picture of the breakdown of the processing industry, if we look at the distribution from 2016 (Figure 7), we see again that a large part of the graph consists of oil and food production. If we look at the share of other sectors related to oil production – the chemical industry and rubber production, for example – we see that the hydrocarbon industry has an even larger share in overall processing.



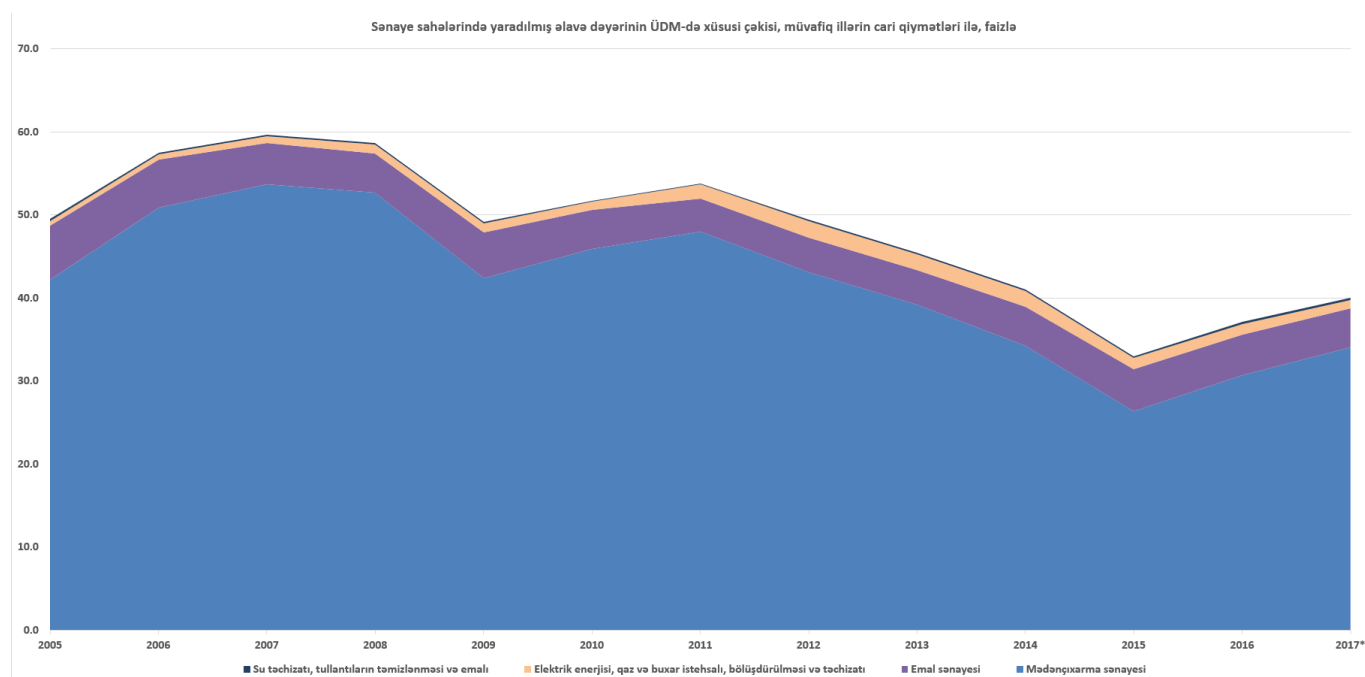
**Figure 7<sup>[5]</sup>: Sectoral distribution of total output in the processing sector**

If we look at which industries create the total value added in industry, i.e. the value created exclusively in Azerbaijan (Figure 8), and the share of this value for each sector as a percentage of GDP (Figure 9), we see that the share of resource extraction, primarily the oil and gas sector, has increased even more, while the share of industry as a whole in GDP has decreased in recent years due to the decline in oil prices (see Figure 9).





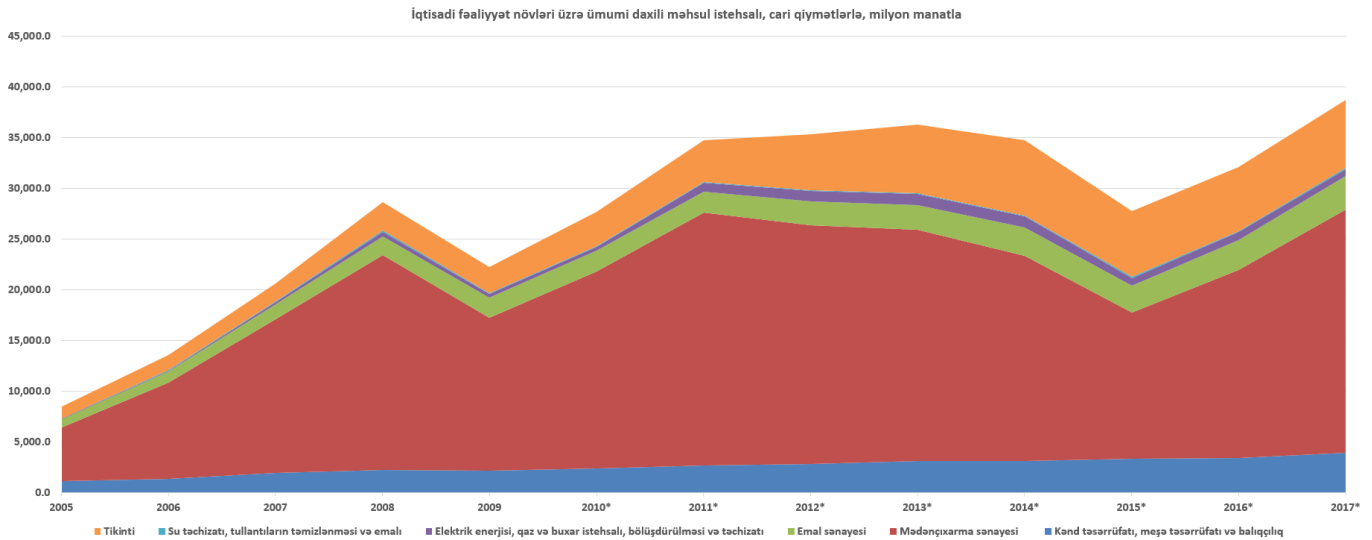
**Figure 8<sup>[6]</sup>: Value added in industrial sectors**



**Figure 9<sup>[7]</sup>: Value added in industry as a percentage of GDP, in current prices for each year**

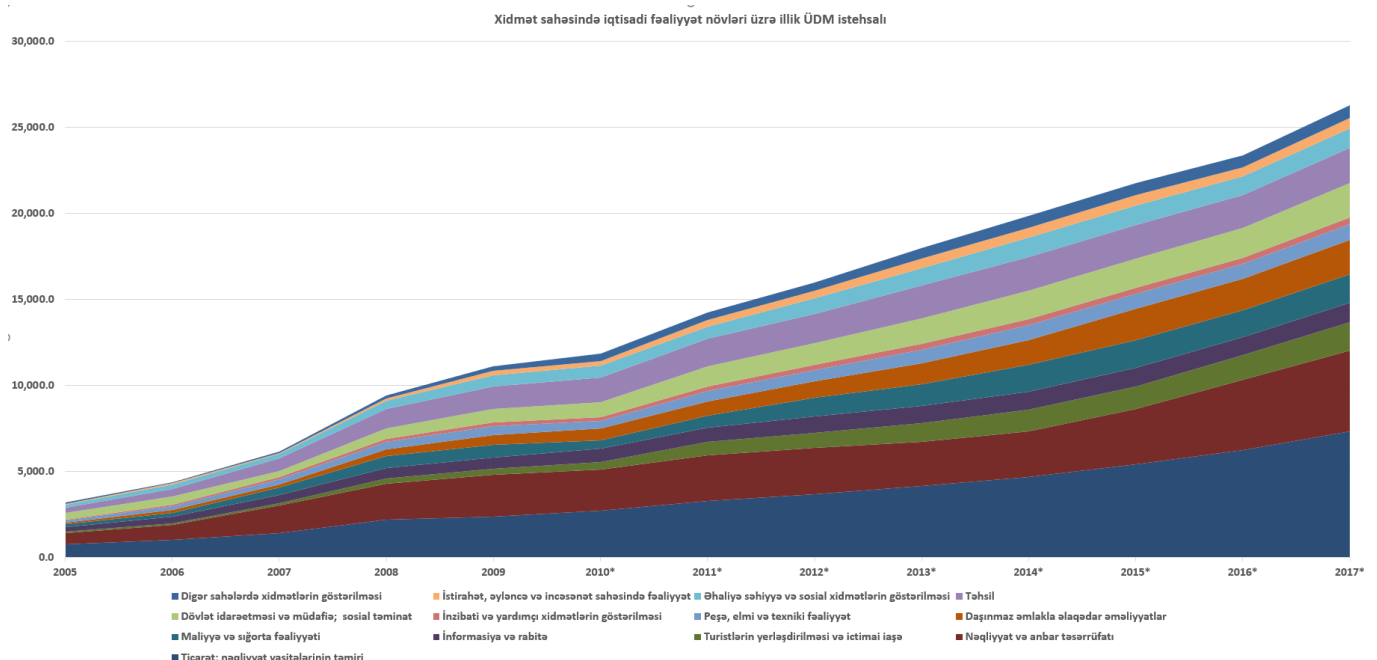
As can be seen from the graphs presented above, the processing industry, which consists mainly of the oil and gas sector, and the extractive industry determine the value created in industry, which accounts for 50% of GDP. Even if we add the construction sector, the picture will not change significantly

(Figure 10).



**Figure 10<sup>[8]</sup>: GDP production by type of economic activity in the industrial sector**

In the next graph, we see a breakdown of the areas within the service sector, which accounted for 38% of GDP in 2016 (Figure 11).



**Figure 11<sup>[9]</sup>: Annual GDP production by type of economic activity in the service sector**

We see that these areas mainly include trade, vehicle repair,

finance and insurance, state services, real estate, transportation, and health services. It is known from macroeconomic theory that, put simply, value added in the service sector mainly refers to the redistribution of income, i.e. the distribution of value added in industry to other service sectors in the economy.<sup>[10]</sup>

There remains agriculture (see Figure 10). Although its share of economic growth is the smallest, it is clear from the graph that if we exclude oil and gas and related sectors, agriculture will be the largest remaining sector, and in recent years, after the fall in oil prices and the economic crisis in Azerbaijan, as a result of the devaluation of the currency, we can see that agriculture's share grew.

On the other hand, BP, the main oil producer in Azerbaijan, has stated that by 2050 it will completely replace oil production with alternative energy sources.<sup>[11]</sup> McKinsey predicts that global oil demand will stabilize after 2025 and decline over the following 10 years.<sup>[12]</sup> Meanwhile, global oil production is expected to increase due to the introduction of new technologies.<sup>[13]</sup> This again means that oil prices will fall in the medium and long term. At the same time, oil prices over the past 10 years and future technological developments and structural changes in the global economy suggest that fluctuations in oil prices will become more acute and volatile than in the second half of the 20th century. These two issues – the more volatile changes in oil prices – indicate that economic returns will decline gradually in an unstable manner, in the coming years.

The prospects for oil production in Azerbaijan in the upcoming decade do not look positive. Meanwhile, the trend in oil prices suggests that the growth of global oil demand is declining rapidly.<sup>[14]</sup> Given that oil companies are aware of this slowdown and are interested in increasing production to

maintain their market position and make as much profit as possible before the end of the oil era,<sup>[15]</sup> it seems unrealistic that oil prices would rise above an average of 40-45 USD per year over the next 10 years. This is considered the best-case scenario.

## **Complications of oil dependence**

Oil economies have a number of distinctive characteristics in terms of social, political and economic development. Not surprisingly, in countries such as Norway, where complex institutional development and effective economic policies are in place, diversification of the non-oil sector has been, at best, partially successful.<sup>[16]</sup> All other natural-resource dependent countries lag behind in terms of diversification many times over. Crude oil production and export predetermine certain political and macroeconomic relations, seriously hindering the development of the non-oil sector.

As production and exports increase in a country, the purchasing power of the population increases (becomes richer), the demand for the national currency in the local and international markets increases, and as a result the value of the currency increases. This growth, in turn, further strengthens the purchasing power of the country's population relative to foreign currencies (in terms of trade). When a country's production and exports are diversified, development becomes more sustainable both in terms of income distribution among the population and the sensitivity of the industry to international demand. In countries where production and exports are dependent on one or few natural resources, especially if the economy is small in terms of population, economic development becomes more unsustainable because it depends on the international demand for the products and services produced and exported, and the prices of those products and services.

This instability has a number of features, of which the Dutch

disease has the biggest impact. The Dutch disease is a decline in the competitiveness of relatively underdeveloped industries and services due to the rapid appreciation of a country's currency as GDP rises. A rapidly appreciating currency makes a country's exports more expensive for foreigners and its imports cheaper. Therefore, local producers become less competitive in the domestic and foreign markets. Their products are more expensive and, as a result, cannot compete. If the economy is diversified, this problem does not occur. When the economy depends on one natural resource, all other sectors soon fail. If the decline in the competitiveness of other sectors continues for a long time, the loss of knowledge, skills, infrastructure, legislation, etc. required in those sectors and, in turn, their failure, lead to the failure of other areas related to them.<sup>[17]</sup>

If the resource in question is oil the situation is exacerbated. Since the oil industry provides a large portion of GDP but employs only a tiny portion of the population, oil revenues are distributed to a small group of people, or the distribution of those revenues to the population in various forms is at the whim of those who control the oil sector and revenues. This, in turn, leads to strong economic and political centralization, as well as economic rent collection and corruption.

The Dutch disease is a serious problem in Azerbaijan. The appreciation of the national currency between 2005 and 2014 sharply reduced the competitiveness of exports and imports that existed before the increase in oil exports in other sectors, and soon led to a sharp increase in the share of oil revenues in GDP.<sup>[18]</sup>

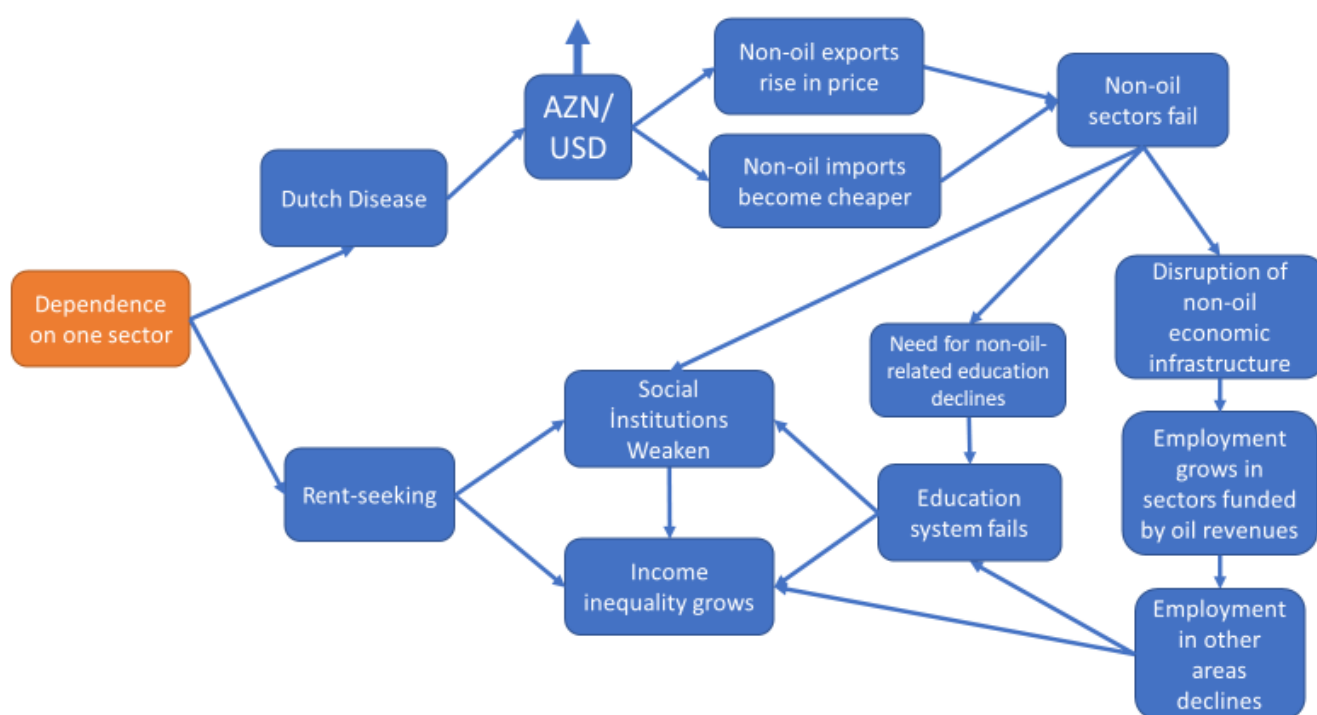
The underdevelopment of the non-oil sector is due to the fact that education (especially scientific research) – which is a key determinant of economic growth and, in a broader sense, long-term economic development – depends on the oil sector and

other relevant sectors, resulting in an orientation in education toward those profitable sectors (petrochemical engineering, construction, finance, etc.). Although the investment of oil revenues in the development of construction and infrastructure creates a certain demand for education in other areas, most of the demand for goods and services in those sectors is met by imports. Local import-substituting industries (e.g. local companies offering construction materials such as cement and rebar, as well as related services) are largely dependent on imports in terms of the value chain. Thus, the specialties that determine the diversified development of the non-oil sector (especially vocational specialties, including IT, agriculture, light and heavy industry, as well as other fields – physics, mathematics, biology, chemistry, philosophy, economics, medicine, law, political theory, sociology, archeology, etc.) lag behind. Graduates who are qualified in these fields receive salaries many times lower than graduates in the most in-demand fields, and entrepreneurs earn much smaller profits.<sup>[\[19\]](#)</sup>

Research shows that there is a direct correlation between institutional development and reducing dependence on natural resources. If natural resource economies have well-developed democratic institutions at the time of the discovery, production, and export of the resources, then the influence of the factors discussed above is reduced.<sup>[\[20\]](#)</sup> However, in societies where democratic and social control institutions are underdeveloped, rather than investing revenues in long-term socio-economic development, the misappropriation of natural resources serves the short-term interests of the various groups that control the government. As a result, social and economic institutions become tools for the distribution and redistribution of oil revenues in the economy, and are corrupted. This corruption encompasses all other areas, with the exception of those that will not directly affect the short-term decline in oil revenues, but at the same time will

not endanger the power of the ruling elite. Such corruption is not petty corruption, but organized corruption. This includes, for example, all areas, including education and health care, which do not pose a direct threat to revenues or their management. [\[21\]](#)

For the reasons listed above, authority is represented not by formal political institutions (parliament, judiciary, media, etc.), but by various groups seeking to exercise control over it, or by a group forged in the struggle between these groups. Economic policy is not strategic, but tactical, and is based on the consensus of interest groups seeking to share control over power. Thus, economic policy remains powerless in managing economic and political risks. [\[22\]](#)



## Scheme 1: The mechanism of the Dutch disease

### Why agriculture should be a priority

In the coming decades, Azerbaijan's incomes and the population's living standards will no longer be as they were in 2008-2014 due to the above factors. The trend shows that

Azerbaijani society will not be able to reach the same level of income for at least several decades. This does not change even if we take into account all the factors of economic development at present, as well as the challenges. In the coming decades, Azerbaijan's economy will be struggling to survive.

Therefore, the Azerbaijani government must ensure the sustainability of the post-oil economy for the next 10-15 years and beyond. This guarantee can only come from the non-oil sector. However, the government must make a strategic decision about which non-oil sector to support (of course, many sectors could be developed, but the government's resources are limited and must be targeted). Such a choice must be strategic, and it must meet two conditions; post-oil economic risk management and the golden rule of economics – a *comparative advantage*.

“Comparative advantage” means that the sector supported by the state should be the easiest one to develop and the one to bring the most profit. For example, theoretically, any company in Azerbaijan could produce aircraft. However, if Boeing spends 10 million USD to construct an airplane, Airbus 13 million USD, and a Russian company 18 million USD, in Azerbaijan it could cost 100 million USD. That is to say, the opportunity cost will be expensive.

There are three areas that can be developed without exorbitant opportunity costs and the government is trying to make significant investments in each of them, namely the tourism, ICT, and agricultural sectors.

The ICT sector is promising, but:

– *The ICT sector is directly related to ICT education. It is a long-term process to organize ICT education and it will need more time before it produces results. This often takes decades and while it is a logical choice in the long term, it produces nothing in the short term. In order to develop a decent ICT*



*sector, a serious education system in mathematics, physics and computer sciences must be established in Azerbaijan from preschool to doctoral programs. It will take decades, even if there is the will to do it and a good approach (which is the biggest issue).*

*– However, there is also the issue of price competitiveness. To ensure the international competitiveness of the ICT sector in Azerbaijan, the value of the manat must be significantly reduced so that local companies can offer cheaper services than in Ukraine, Belarus, or Armenia. This does not seem possible in the short term. Such a depreciation of the manat, as noted above, could create a number of problems, such food insecurity and import-based inflation.*

The prospects for the tourism sector in Azerbaijan are very limited due to issues of infrastructure, resources, and comparative advantage. To date, investment has been aimed at luxury tourism, usually ignoring budget tourism.<sup>[23]</sup> A lack of infrastructure and the absence of any strategy are the main problems of the tourism sector.<sup>[24]</sup> In order to have large-scale budget tourism, investment is needed in large-scale infrastructure and service development programs, which will not be effective. Given the current high value of the Azerbaijani manat and taking into account the above factors, the Azerbaijani tourism sector cannot compete with Georgia and Armenia. In terms of resources, only Baku and some northern regions have certain potential. For these three reasons, the tourism sector cannot become the leading industry of the post-oil period in Azerbaijan. Tourism could be used mainly to increase employment, and to expand and diversify the incomes of the rural population. In terms of comparative advantage, today Azerbaijan cannot compete with its neighbors in the field of tourism. (Although Azerbaijan does not lag far behind in the tourism competitiveness index,<sup>[25]</sup> we see a bigger gap when we look at the tourism infrastructure and the number of tourists.) With the devaluation of the manat some development

of the tourism sector is possible, but it will never replace oil revenues and it cannot become the leading industry in the economy in the near future.

Other sectors, such as Azerbaijan's role as a transport corridor (east-west, south-north), have been exaggerated. Azerbaijan's location is a strategic disadvantage. It is not placed along any major international transport corridor, and with a few minor exceptions, it has no potential as a transport corridor overall. A significant part of international trade is conducted by sea. The remaining smaller part is conducted by dry land or by air. None of this passes through Azerbaijan. Selling Turkmen gas to Europe will not be enough to turn Azerbaijan into an international transport corridor.

Looking at the consequences of the oil economy and the next 10 years, the most important issue facing Azerbaijan is food security. If oil prices fall sharply and remain low for any extended period of time, the value of the Azerbaijani manat will fall sharply. In that case, the price of the food basket, coming mainly from imports, will rise proportionally. Hundreds of thousands of families will face food price inflation. Assuming that the vast majority of the population in Azerbaijan spends any rise in their income on food after 2014, the sharp rise in food prices for that segment of the population will become an issue of food security.

In the short term, the best option for the government to reduce the effects of the oil crisis and manage its risks is agriculture. There is a lot of land fit for agriculture in Azerbaijan, there is water more or less (although this is now in question), and there is an appropriate climate. There is nothing else. Azerbaijan does not have the educational infrastructure to build any serious industry. There is no vocational education. There is no engineering. Training in the applied fields of chemistry and physics is zero. The scientific heritage of the Soviet Union has also disappeared.

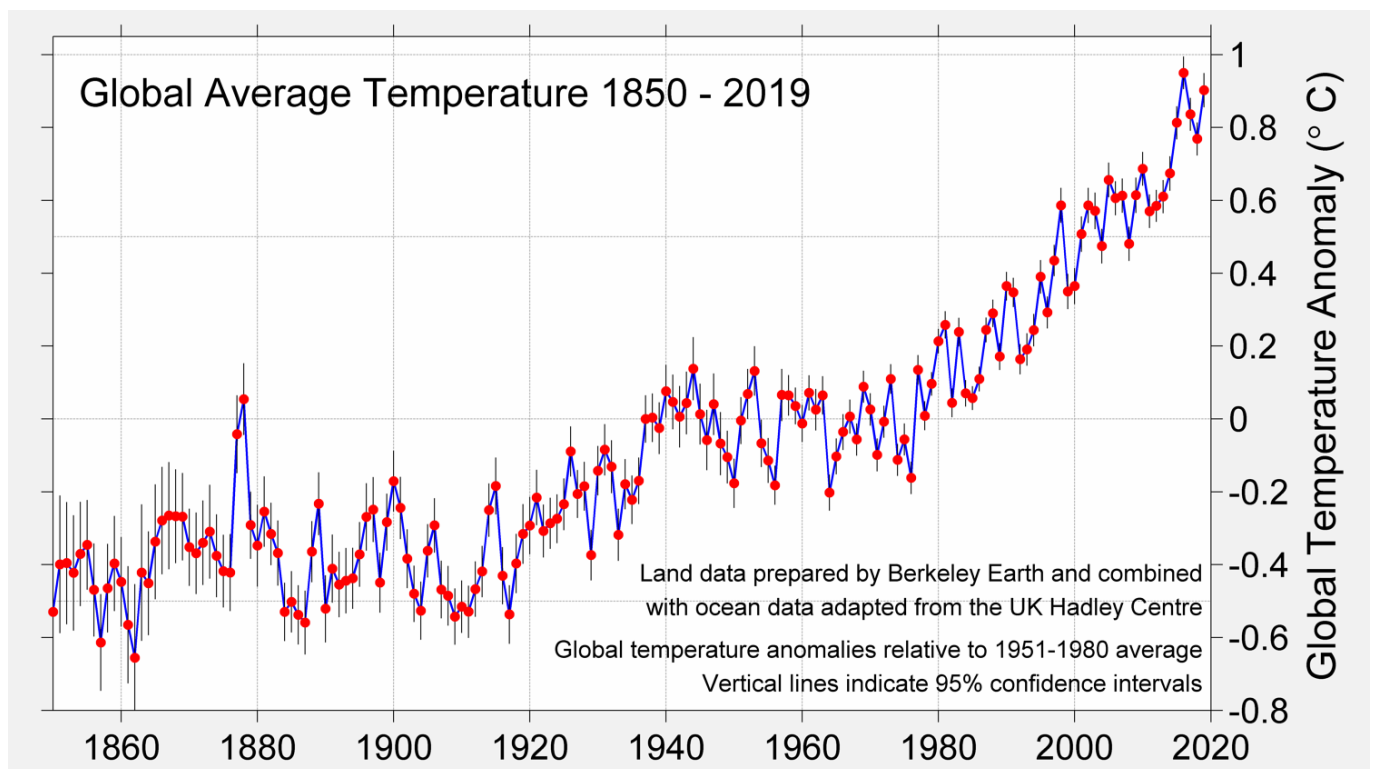
Anyone more or less knowledgeable has left the country, and everyone else is busy calculating the speed at which angels fly (as one physicist at the Azerbaijan Academy of sciences reportedly did last year).<sup>[26]</sup>

Agricultural development is necessary not so much to replace economic growth, but more to ensure food security and sustainable rural development. Such development is necessary to face head-on the long-term post-oil crisis in the coming decades, when Azerbaijan's revenues will decline sharply as food prices rise and food shortages are likely to occur, against the backdrop of world population growth, the effects of climate change, and the global crisis of capitalism.

Clearly the agricultural industry cannot guarantee extensive economic development. The development of agriculture has never been a key factor in economic growth in any developed country or in the transformation into a developed country. Since the added value created by agriculture is so small, it will not be enough to replace oil revenues in Azerbaijan, even if it is highly developed. Of course, with prioritizing agriculture its only option, the Azerbaijani government is in a very difficult position. The problem is that in 20 years we will be talking not only about the replacement of Azerbaijan's oil revenues, but also about the actual survival of the economy. Almost all employment in Azerbaijan is provided by the distribution of oil revenues in the economy. As stated above, if we assume that the share of oil in the Azerbaijani economy will decrease sharply in 10 years, agriculture (although less promising in terms of economic growth) will become the most important sector for providing stability in employment and economic activity, especially against the backdrop of the effects of impending climate change. At the same time, supporting agricultural development does not preclude supporting other sectors as well (such as ICT, tourism, or global transit). Simply put, according to the principle of comparative advantage, priority should be given to agriculture.

## Climate change risks

Climate change, along with social inequality, is the primary threat to the world economy and global sustainable economic development today. For comparison, during the last ice age, the average temperature on Earth was 5°C lower than today. At that time, the sea level was 120m lower, and much of Northern Europe and America were covered with glaciers. It was possible to walk from Europe to Canada across the ice. [\[27\]](#)



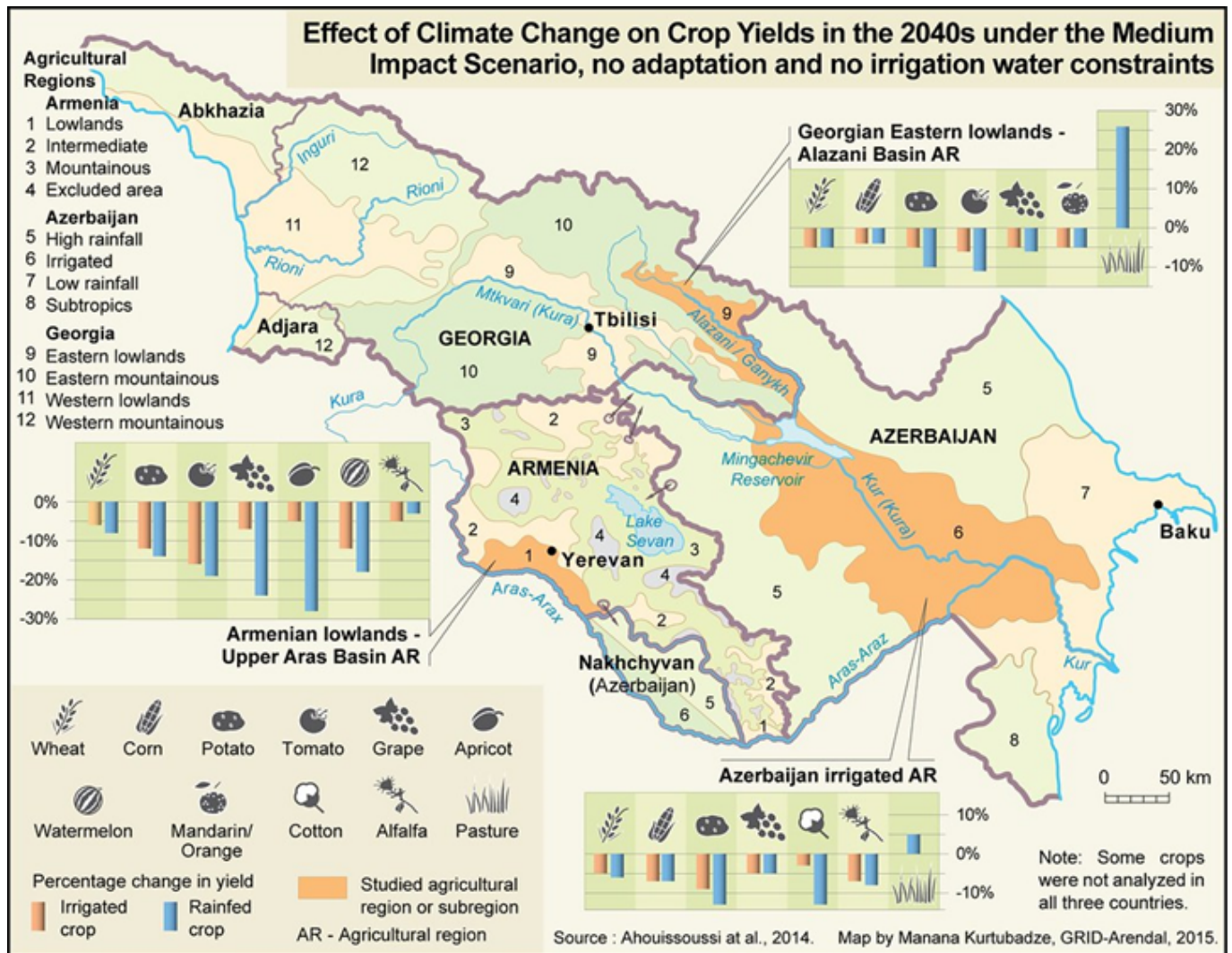
**Figure 12: Average annual temperature variability, 1850-2019**

According to the IPCC, between 1990 and 2000 the global average annual temperature increased by 0.4°C, and precipitation decreased by an average of 10%. In 2000-2020, the warming rate increased even more. For example, in 2019, the average annual temperature increased by 0.8°C compared to 1940-60. The average temperature is expected to increase by 1.5-1.6°C in 2020-2050, and by the end of the century, compared to 1850-1900 the average temperature will increase by 2°C at best and 6.4°C at worst. [\[28\]](#)

In the context of global warming, climate change will affect all sectors in the Caucasus and Azerbaijan, but most significantly agriculture and tourism. This effect will be manifested in fresh water shortages, rising average temperatures, increasing variability and severity in temperatures and climate events, seasonal shifts, changes in precipitation and more variability, as well as an increasing number of natural disasters (floods, hurricanes, etc.) of ever greater severity.<sup>[29]</sup>

The most significant of these is the reduction of freshwater resources. In the Caucasus, 62% of all freshwater is in Georgia, 28% in Armenia, and 10% in Azerbaijan. 70% of Azerbaijan's 10% comes from water basins in Georgia, Armenia, Turkey, Iran, and Russia (rivers, subterranean rivers, glaciers, etc.). In Azerbaijan, at least 25% of water is wasted during use. The situation in Azerbaijan with regard to fresh water resources is critical, not only for the Caucasus, but by any standard. However, every year in Azerbaijan, an average of 300km<sup>2</sup> is flooded and becomes unfit for agriculture. Landslides and floods occurred on average 2-4 times a year in 1960-1990, and an average 15-18 times a year since 2000. Only 49% of arable land is used due to salinization, oil spills, chemical pollution, wind, rain, and erosion due to irrigation. Only 11% of Azerbaijan's territory is forested (2 times less than the norm). In Georgia, it is 40%.<sup>[30]</sup>

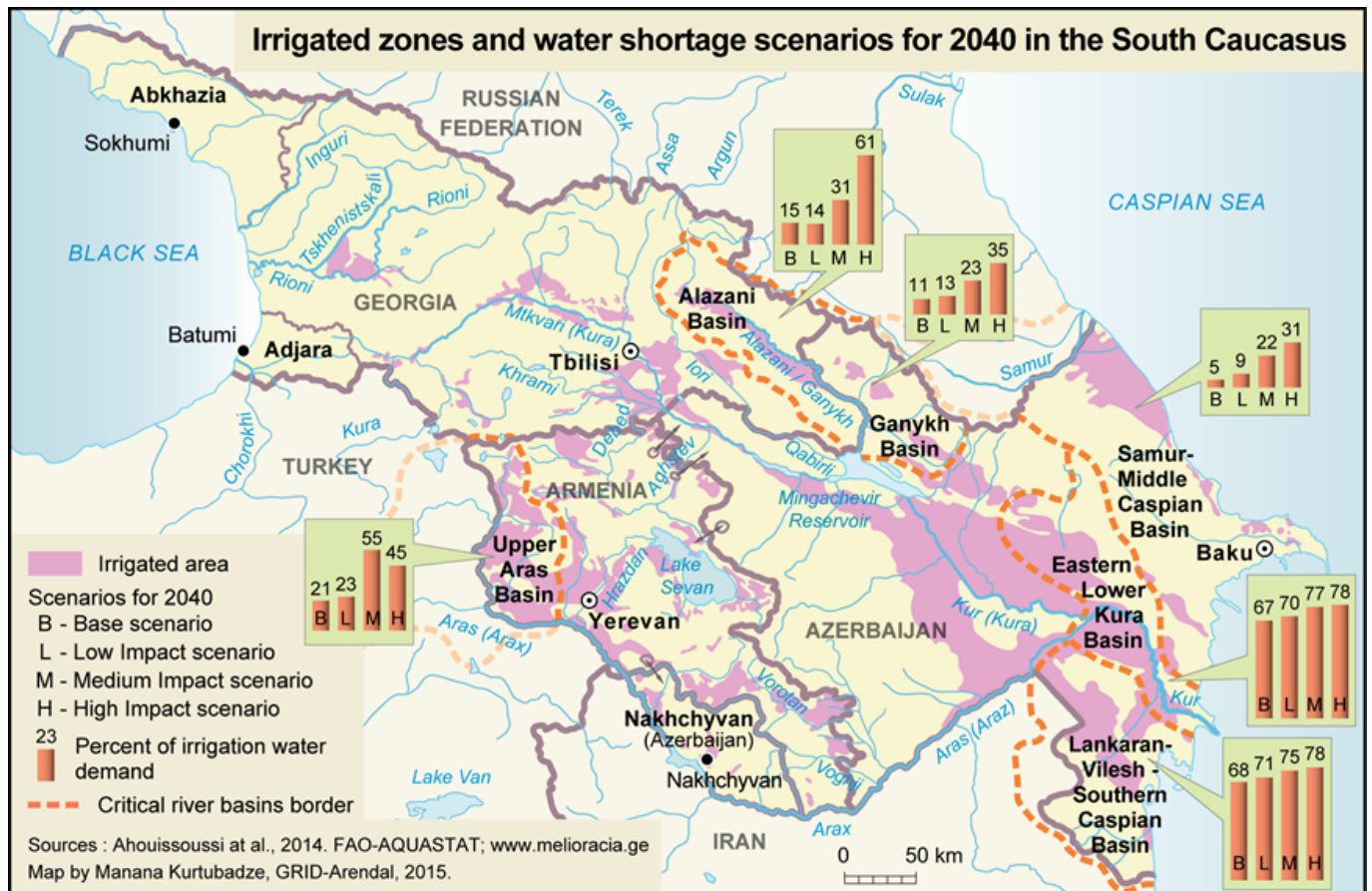
In Figure 14, we see that the majority of irrigated arable land in the Caucasus is in Azerbaijan, and 90% of the arable land in Azerbaijan is irrigated.



**Figure 13: Forecast of the impact of climate change on harvests in the Caucasus in 2040 (assuming no water shortages)**

The next map (Figure 13) shows the water needs of the irrigated arable land. According to the forecast, the demand for irrigation will grow in all regions. In 20 years, the demand for water in the Kur-Araz lowland will increase by 78% at worst and 66% at best. Given that freshwater resources are declining, their distribution is uneven, and water loss is increasing due to poor infrastructure, climate change will pose a serious threat to Azerbaijan's agriculture and, consequently, food security amid the growing demand for irrigation.





**Figure 14: Irrigated zones and water shortage scenarios for 2040 in the South Caucasus**

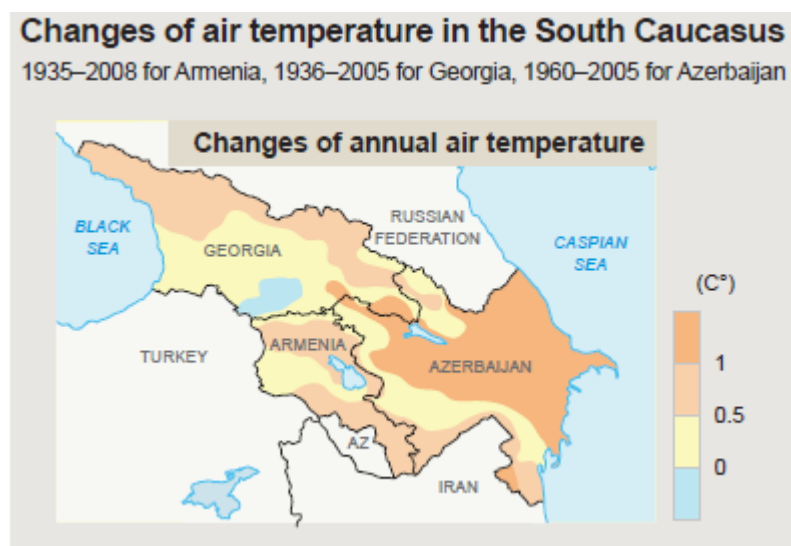
Looking at the average annual increase in temperature over the last 10 years in Azerbaijan, especially compared to the other two other South Caucasus countries, we should expect that a rise of more than 1°C will have more severe consequences in Azerbaijan in the coming decades, and that droughts and precipitation in particular will become more volatile.

As a result of climate change, it is expected that the level of the Caspian Sea will rise, resulting in rivers overflowing; glaciers will shrink further (glaciers in the Caucasus will be halved by 2020); 20% of freshwater resources will disappear, halving freshwater resources per capita; and there will be water shortages over an area of 300,000 hectares.

These changes will have a number of effects on agriculture in Azerbaijan, which are already being felt, especially in the last five years. These effects damage not only agricultural

production (in terms of food security), but also productivity and, ultimately, incomes.<sup>[31]</sup>

Climate change is affecting agriculture in many ways. The effects of temperature volatility, and of its growing frequency and intensity, have already been observed on crop pollination; insect population size, growth, and distribution; delayed flowering periods; and delayed post-flowering pollination; as well as the effects of cold temperatures or winds on plant productivity.<sup>[32]</sup> This has been felt strongly in the most obvious example – beekeeping.



**Figure 15: Changes of annual air temperature in South Caucasus; source: “Climate Change in the South Caucasus: A visual Synthesis” Zoi Environment Network, International Environment House, January, 2012, p. 17**

At the same time, rainfall and flood waters have had a significant impact on forage crop productivity in parts of the Aran region. Every day we hear reports that the entire Kura-Araz lowland has been damaged as a result of rising groundwater, and that arable lands have become unusable as a result of the flooding of the Kura basin.

Another effect of warming is water shortage. The increased evaporation of water basins, the drying of rivers in the



foothills, and the unstable fluctuations in the volume of water in rivers fed throughout the season by glaciers are seriously impacting non-irrigated agriculture. Given that the amount of groundwater is declining, having been aggressively exploited through artesian and subartesian wells for nearly 60 years, it is expected that hundreds of thousands of hectares of arable land will face water shortages in the near future. The effects on livestock can be seen both in the reduction of forage crop productivity and in cattle being directly tested by rising temperatures.

When these forces are combined, they create a cumulative effect. Although the impact of any of them separately is not significant or geographically comprehensive, together they have severe and varying impacts on different agricultural activities in different regions. The best climate change forecasts suggest that these effects will increase more rapidly in the coming decades. As a result, market prices for agricultural products will rise. This trend is projected to occur all over the world. At the same time, the frequency and severity of price fluctuations will increase, and as a result, we will see more and more volatility in the prices of food products. Although the rise in prices in itself creates a number of economic difficulties in terms of demand, the increasingly unpredictable volatility will also have economic consequences.

### **How to ensure adaptation**

For all these reasons, in order to prevent the food shortages and food price volatility that Azerbaijan faces in the near future and to create a sustainable agricultural system, given the institutional and macroeconomic difficulties brought about by oil dependence as well as the effects of climate change, Azerbaijani society must carry out not short-term, but results-oriented strategic development.

Obviously, there is nothing Azerbaijan can do to prevent

climate change and global warming in any significant way. Azerbaijan's direct contribution to global warming is very low, and its economy is insignificant, too small to contribute to reducing global greenhouse gas emissions. Therefore, the primary, critical, and urgent issue we need to address is adaptation to climate change and the post-oil era.

However, the development of the non-oil sector and any adaptation to climate change are complicated by the difficulties emanating from the Azerbaijani economy's dependence on oil, such as the collapse of the non-oil sector and education system that supports it, corrupt rent-seeking institutions, weak local self-government, strongly centralized politics and decision-making, the high costs of maintaining the manat's competitiveness in foreign exchange markets, and the construction of a general management and organizational culture based on rent-seeking and a strong hierarchy.

Given that falling oil revenues and climate change pose a serious threat to Azerbaijan's post-oil economy, the government is already too late to ensure a socially and environmentally sustainable economy in Azerbaijan in the coming decades. Therefore, more urgent measures must be taken to minimize risks and prevent long-term economic recession and social hardship.

Reforms carried out in Azerbaijan over the past five years have been accompanied by government investments in agriculture, tourism, ICT, and a number of other sectors. Although this is a positive trend overall, unfortunately, Azerbaijan's development policy is chaotic and not strategic. After the inevitable devaluation of the manat in 2015-2016 as a result of the sharp drop in oil prices, the government had two strategic options for the development of agriculture:

### **1. Develop value chains based on small and medium enterprises**

In this option, small and medium-sized entrepreneurs operating within supply units of value chains link up with others in the

market and the provision of products and services is regulated through the market relations of numerous small entrepreneurs, while income is distributed among them across the value chain (Figure 16.). In such a development model, income is not high in the short term, but in the medium and long term it is superior in terms of both income distribution and adaptation and resistance to climate change. In the long term, this approach is more effective in providing income and social welfare, ensuring self-employment for a large part of the population.

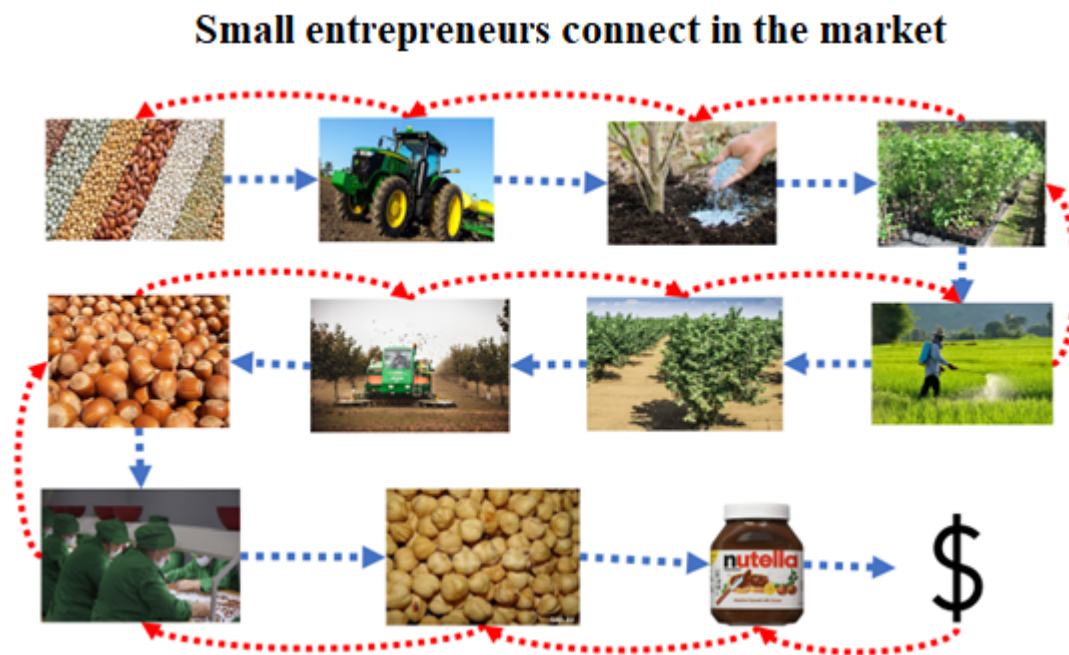
The risks are more diversified because, as the effects and risks of climate change are distributed throughout the value chain, hundreds of small businesses belonging to different value chains in different parts of the country will not be affected in the same ways or simultaneously. At the same time, since these risks are more diverse as an economic unit, the bankruptcy of a group of entrepreneurs at any stage of the value chain does not threaten the overall value chain, and the risk can be eliminated through the state's mechanisms for adapting appropriately in advance, as well as for supporting the affected entrepreneur.

This approach is also more sustainable from a macroeconomic point of view. Agriculture built on small and medium-sized enterprises and diversified value chains is both less risky in terms of financing and preferable in terms of a more equitable distribution of income (i.e. more sustainable employment).<sup>[\[33\]](#)</sup>

Finally, the diversification of value chains on the basis of small and medium-sized enterprises strengthens the resilience of individual communities, i.e. their ability to adapt to a more equal distribution of economic and social power, local governance, and, consequently, the economic challenges of climate change and the post-oil era.<sup>[\[34\]](#)</sup>

Among the successful countries where agriculture is based on small and medium enterprises are the Netherlands, Israel,

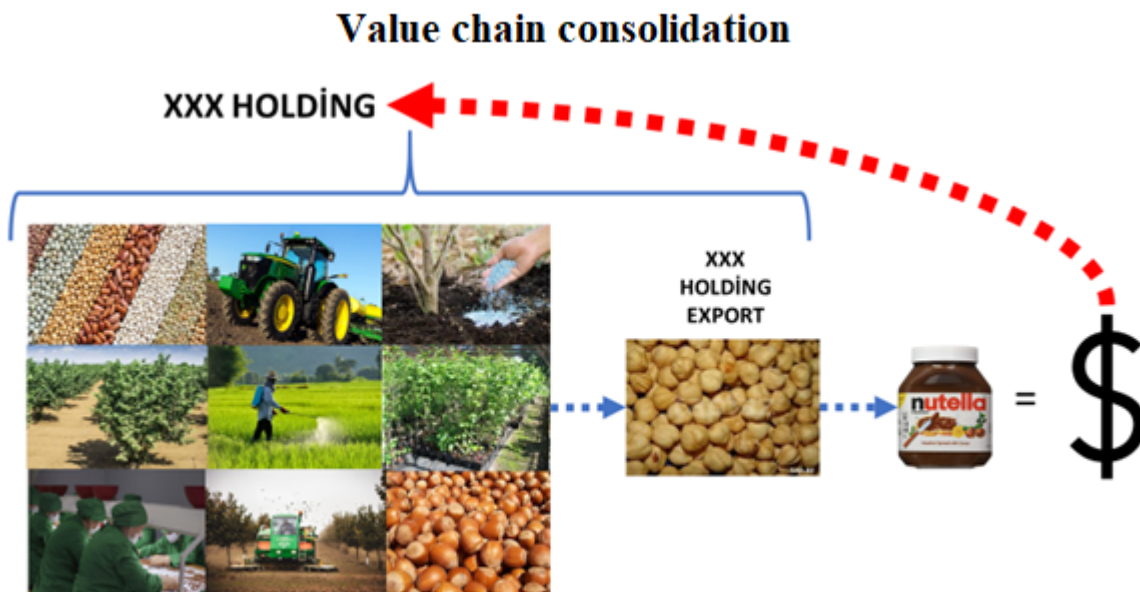
Spain, and others, which are now world leaders in terms of agricultural productivity.<sup>[35]</sup>



**Figure 16: Value chain based on small and medium-sized enterprises**

## ***2. Consolidate value chains to create an economy of scale***

The second option is to consolidate the value chain in the hands of one or more businesses or holding companies, and to employ the majority of the population in the holding company's businesses (see Figure 17).



**Figure 17: Value chain consolidation in industrial farming (economies of scale)**

Since the second option promises higher returns in the short term (although this is controversial and occurs only when several conditions are met) and the employment of a majority of the rural population as hired labor (in the near future, most employees outside of the public and service sectors will be rural), it will lead to a concentration of profits among company owners and a more unequal distribution of profits.

At the same time, agriculture, which consists of consolidated value chains under the banner of several holding companies, <sup>[36]</sup> is extremely sensitive to the effects of climate change. Because if the effects of climate change seriously damage one or more segments of the value chain, it undermines the overall economic sustainability and balance sheet of the company that consolidated that value chain. Due to the large size and bureaucratization of the holding company, both its adaptation to the effects of climate change and its response to damage are always delayed; since internal production-supply relations are based on labor relations rather than market, efficiency and representation decrease as decision-making is concentrated. All this leads to economic inefficiency, which

results in holding companies and large farms being less efficient and productive than average small and medium-sized farms.<sup>[37]</sup>

This approach is also macroeconomically unsustainable. Although income is very high in the short term, a large part of it goes to the owner as profit, as a result of which the distribution of income is uneven. The collapse of one such company means the loss of thousands of jobs. Unlike farm cooperatives and community-based production, holding companies will not prioritize workers' incomes because their primary interest is to protect profits. This will reduce the resilience of the agricultural market, which consists mainly of holding companies, in terms of labor market stability and employment. Of course, the relationship between the size of a farm and its ability to adapt to climate change also depends on the country's economic policy and support mechanisms.

At the same time, in a country where agriculture, i.e. the organization of the production and service of the food supply, is controlled by holding companies, food supply policy serves the interests of a group of business owners rather than the interests of the population, which in turn expands the state's opportunities to influence agricultural policy in order to increase the owners' profits and further consolidate value chains.<sup>[38]</sup>

This approach is usually implemented in countries with large tracts of land and requires high-tech investment. Since large holding companies are technologically intensive, and the necessary technologies are not produced in Azerbaijan, their import dependence is many times higher than that of small entrepreneurs, and it cannot be reduced in the near future. Given that the manat will depreciate in the medium and long term, both the acquisition and maintenance (amortization) of this technology will become increasingly expensive. On the other hand, since the value of the final product or service

sold is largely determined in a foreign market, rising costs will reduce revenue margins and reduce the competitiveness of holding companies by increasingly squeezing their profits. Given that the Azerbaijani economy is not expected to produce a modern combine or a digital irrigation system in the next 30 years, it is unlikely that they will be able to cope with this challenge.

Finally, we would like to say a few words about the widespread corruption in Azerbaijan produced by oil dependence.<sup>[39]</sup> There is less corruption in small enterprises than in large ones. Since they have low income margins, they cannot sacrifice productivity. Embezzlement and bribes will be rare on a farm run by five people. In a large holding company with 10,000 employees, we can assume that there will be many times more corruption. This is the case in every country in the world. Azerbaijan, where the CPI index<sup>[40]</sup> is high, will be no exception. This, among other things, is the cause of sharply reduced efficiency in large holding companies.

For the reasons listed above, many holding companies involved in agriculture and food processing in Azerbaijan have negative financial balances, despite the fact that most of their expenses are subsidized. Regardless of their management, the situation will likely worsen in the long run.

### **The government's choice**

The Azerbaijani government is currently pursuing the second option due to factors brought about by oil dependence. Strong economic and political centralization, economic rent collection, and the high value of the manat make the second option even more attractive for the Azerbaijani government. In the long run, however, this is a trap. The sooner the government realizes that this is the wrong strategy, and the sooner it changes course, the more opportunities there will be to build a sustainable economy.

It is true that there has been wide public discussion of the development of small and medium enterprises. However, the progress made and its relative scale show that the priority is still mainly accorded to the second option. For example, the Small and Medium Business Development Agency (SMBDA) has been established to provide advice, legal assistance, and market access support to small and medium-sized enterprises. However, the mandate and budget of the institution, which was intended to promote the development of small and medium-sized enterprises, should have been many times larger, more comprehensive, and more multifaceted. Note that agriculture is only one part of the scope of this institution.

On the other hand, it is unfortunately impossible to pursue both options. Small and medium-sized entrepreneurs cannot compete in a market with holding companies. Holding companies' ability to dictate market prices, as well as their ability to influence economic and agrarian policies, allow them to link small and medium-sized businesses to their own supply chains, or to privatize them and integrate their farms into their own value chains, turning them into hired labor. On the one hand, they are thus able to increase supply in the supply chain and in the labor market, and on the other hand, they reduce their competitors in the consumer market.

We can assume that the reasoning behind the government's choice is to make high profits in the short term to replace declining oil revenues, as well as to facilitate social control through the vertical distribution of decision-making and money in society. Managing the interests of tens of thousands of small entrepreneurs is more difficult than managing the interests of hundreds of thousands of hired laborers. But this decision, as we said earlier, is the result of short-term thinking. Soon the strained economic situation, drought, water shortages, low productivity, diseases, etc. combined with 45°C temperatures, will lead first to economic and then to social crisis. Then, unfortunately, there will no longer be the same opportunity as today (even though it's



already late) to rectify the situation.

As a result, against the backdrop of growing poverty and income inequality, more and more people will be affected by climate change, GDP will decline ever more rapidly, and a large part of the population will face food shortages (rising food prices) and famine in the worst case scenario.

Of course, this scenario is not convincing for many because, according to them, “there has never been a famine” in Azerbaijan. However, there are simple reasons why such thinking is so prevalent. First of all, there is no information about this issue until the 19th century. In the 19th century, Azerbaijan’s food security was ensured by the Russian Empire, and in the 20th century by the Soviet government. It has been ensured by oil since 1990. It is an open question as to who will ensure it, how, and under what conditions after 2030.

## **What to do**

In order to make long-term economic development in Azerbaijan sustainable from social and environmental perspectives, the Azerbaijani government must take a strategic approach to the development of the post-oil period. From the point of view of agricultural development, the strategy should be to transition from the second to the first option as much as possible and take this into account in agriculture, tourism, ICT, and other sectors to be determined. A strategy should be developed based on results-oriented methods to reduce and adapt to the effects of climate change.

For example, to protect water bodies and reduce water loss, the following **strategic** measures (among others) should be implemented:

- Repair irrigation canals (pave with concrete and cover them);

- Construct small reservoirs on small rivers;
- Provide irrigation systems and water distribution;
- Repair existing “karizes” (qanat) and excavate new ones;
- Reduce the use of artesian and subartesian water;
- Improve irrigation rules, teach farmers about irrigation by providing them with education;
- Regulate water prices through taxation and use the revenues to improve the water supply;
- Treat and reuse wastewater;
- Start a long-term, local project to desalinate seawater (Azerbaijan probably can’t afford to import the technology and capital goods);

Stop watering the grass in parks in Baku and plant trees in their place (Baku is not Las Vegas; no one expects the government to build green grass parks)

Non-strategic, ineffective decisions such as: “The President has ordered the construction of 10 reservoirs,” are unlikely to lead to the development of a sustainable non-oil sector. For example, why 10? Maybe nine would be enough? Maybe 12 should be built? It’s the same in other areas.

At the heart of any approach that combines all these steps is the need to organize the transition at the local, rather than the national, level, to develop an integrated adaptation strategy for each region, to build a community-based cooperative organization of production and services, and to do so with the participation of locals – small and medium-sized farmers and entrepreneurs. They must be placed at the heart of the issue, and their interests must be taken into account and guaranteed.

In the long term in the non-oil sector in Azerbaijan, against

the backdrop of the adaptation of agriculture to climate change, any development strategy must ultimately focus on a reform of the education system. The reason is simple – any development is a development of productivity. The main factor determining productivity is technology. The main determinant of technology is education and scientific research. Therefore, although it is already very late, the first measure the Azerbaijani government must take is to reform education in line with an economic development strategy, in particular to bring competency-based education to a level that can support Azerbaijan's production and service sectors, make them sustainable in the face of international competition, and prepare new human resources. In parallel, it is necessary to create a research institute to ensure sustainable development. This is, of course, the most difficult part. The brain drain makes it even more difficult. But there will be no development without it. After a certain level of economic development, it is impossible to develop without scientific research. There has never been such a case.

Also, forget about Baku. Baku is an unsustainable city in every sense. The only reason for Baku's existence is oil. Without oil, life in Baku will not be as dynamic as before. Once oil becomes economically insignificant, it will no longer be possible to sustain Baku. The economy will not allow it. And then the process will be very painful. Therefore, Baku must be strategically emptied and gradually reduced in size in order to make it sustainable, so that it does not become a city of ghosts in 30 years. (We understand that this is painful. But if we are rational, if we start to evacuate Baku now, we will see the benefits in the long run. Us and Baku, too. But let's leave this topic for another time ...)

## **Conclusion**

Azerbaijan has lost its chance to become a developed country. This is our own fault on the one hand, and a result of conditions dictated by economic laws and global economic

relations on the other. Against the backdrop of the global structural crisis of capitalism which has been ongoing for more than 10 years, the economic situation is unlikely to improve in the next decades. The situation is deteriorating in terms of environmental pollution and social inequality. So far, there is no sign that things will improve. Therefore, we must determine the minimum conditions that we will accept in order not to become a failed state, and as a society we must establish and implement a strategy to meet those conditions. Our goal must be to build a sustainable economy in which our children will live a healthy life, people will not be tested by food shortages, there will be no poverty, there will be less social inequality, and there will be long-term environmental goals. We should not underestimate the economic risks facing Azerbaijan in order to comfort ourselves, but rather we must look at them realistically to be better prepared to manage them.

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[4] From top to bottom: (1) installation and repair of machinery and equipment; (2) manufacture of jewelry, musical, sports, and medical equipment; (3) furniture production; (4) manufacture of other vehicles; (5) manufacture of cars and trailers; (6) manufacture of machinery and equipment; (7)

manufacture of electrical equipment; (8) manufacture of computers and other electronic equipment; (9) manufacture of finished metal products other than machinery and equipment; (10) metallurgical industry; (11) production of construction materials; (12) production of rubber and plastic products; (13) manufacture of pharmaceutical products; (14) chemical industry; (15) production of petroleum products; (16) printing activities; (17) production of paper and cardboard; (18) wood processing and production of wood products; (19) manufacture of leather and leather products, footwear; (20) clothing production; (21) textile industry; (22) manufacture of tobacco products; (23) beverage production; (24) food production.

[\[5\]](#) From top to bottom: (1) food production; (2) beverage production; (3) manufacture of tobacco products; (4) textile industry; (5) clothing production; (6) manufacture of leather and leather products, footwear; (7) wood processing and production of wood products; (8) production of paper and cardboard; (9) printing activities; (10) production of petroleum products; (11) chemical industry; (12) manufacture of pharmaceutical products; (13) production of rubber and plastic products; (14) production of construction materials; (15) metallurgical industry; (16) manufacture of finished metal products other than machinery and equipment; (17) manufacture of computers and other electronic equipment; (18) manufacture of electrical equipment; (19) manufacture of machinery and equipment; (20) manufacture of cars and trailers; (21) manufacture of other vehicles; (22) furniture production; (23) manufacture of jewelry, musical, sports, and medical equipment; (24) installation and repair of machinery and equipment.

[\[6\]](#) From left to right: (1) Water supply, wastewater treatment, and processing; (2) Electrical energy, natural gas, and steam production, distribution, and supply; (3) Processing sector; (4) Extractive industries.

[7] From left to right: (1) Water supply, wastewater treatment, and processing; (2) Electrical energy, natural gas, and steam production, distribution, and supply; (3) Processing sector; (4) Extractive industries.

[8] From left to right: (1) Water supply, wastewater treatment, and processing; (2) Electrical energy, natural gas, and steam production, distribution, and supply; (3) Processing sector; (4) Extractive industries; (5) Agriculture, forestry, and fishing.

[9] From top to bottom: (1) Provision of services in other areas; (2) Public administration and defense; social security; (3) Financial and insurance activities; (4) Trade; repair of vehicles; (5) Activities in the field of recreation, entertainment and art; (6) Provision of administrative and ancillary services; (7) Information and communication; (8) Provision of health and social services to the population; (9) Professional, scientific and technical activities; (10) Tourist accommodation and catering; (11) Education; (12) Real estate transactions; (13) Transport and warehousing.

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