

## The agro-industrial sector as a perspective direction for the development of Kazakhstan architecture: an educational aspect

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**ABSTRACT:** Kazakhstan, the ninth-largest country by area in the world, stretches over extensive open spaces in the centre of Eurasia. Over the past three millennia, according to the region's climate typology, traditions of cattle breeding and plant growing were established here. As part of the former USSR, the republic had an agricultural specialisation. Currently, the agrarian sector represents the most probable direction for the innovative development of the country. Depending on climatic and economic conditions, architects can offer various construction types, which will correspond to Kazakhstan's agrarian specialisation that is agro-industrial complexes, including production and processing plants, city farms, objects of agro-tourism and agrarian settlements. Nowadays, new tasks for the universities of Kazakhstan have emerged, including the preparation of specialists in the field of modern agricultural architecture.

**Keywords:** Architecture of agricultural enterprises, urban farms, agro-tourism, agricultural settlement

### INTRODUCTION

In the former USSR, Kazakhstan had an agricultural specialisation. The so-called *perestroika*, resulting in the collapse of Soviet political system, has led to the transition from a regulated to a market economy, and had significantly reduced the agricultural potential of Kazakhstan through the replacement of large state enterprises with small private companies. Hence, the modernisation and construction of new agricultural facilities came to a halt.

Since the early 1990s, Kazakhstan has been actively developing oil and gas exports, making it the main sector of the national economy. However, due to the decline in world oil prices in recent years, the state has begun to pay special attention to the agricultural sector.

Experts believe that it is the agricultural specialisation on the basis of *green* technologies that will allow Kazakhstan to take a worthy place in the world's economic system, and architectural studies and projects will make this manoeuvre happen more quickly and efficiently.

### AGRARIAN SUBJECT IN ARCHITECTURAL EDUCATION

During the Soviet period, in universities of Kazakhstan, architects were trained in the *architecture of the rural occupied places* specialisation. Currently, the main areas of training are *architecture of residential and public buildings* and *urban construction*. However, despite the lack of specialisation, there is a need to train architects for the growing agricultural sector.

Therefore, in recent years, the Government of Kazakhstan adopted a number of policies aimed at the development of the agricultural sector in the country [1].

Given the relevance of the agricultural subjects, there has been an annual increase of the number of diploma projects and Master's theses on this subject in the university sector. Professors are working to provide a scientific basis for modern agro-industrial architecture for the conditions of Kazakhstan. In the past, during the implementation of educational projects on an agricultural theme, architectural students first had to find structurally-technical implementation of a particular production process. Currently, special attention is being paid to projects that involve innovative

technologies, such as the use of renewable energy sources, and waste-free and environmentally friendly manufacture [2]. In worldwide practice, the expansion has happened in the typology of agricultural facilities, new types of buildings - urban, agricultural businesses, agricultural estates, complexes of agro-tourism and new generation agro-settlements, to name a few.

The history of agricultural production has always been connected with its periphery or suburban spaces. Currently, a negative role in the development of the agricultural industry is played by migration processes: urbanisation *pulls* the rural population into the cities, which entails economic and humanitarian problems.

Modern practice shows that some types of agricultural production no longer require large spaces, and are switching to technologies that allow production in an urban setting. *Urban farms* will bring production closer to the consumer, lead to reduced transport costs, and provide jobs to immigrants, housewives and pensioners. Agricultural parks can become a part of the urbanised environment, familiarising the citizens with the process of growing agricultural produce. Farmhouses will play a significant role in the environmental education of the population, and will become a form of family recreation.

A new type of agro-settlements are necessary for Kazakhstan. Since the collapse of the Soviet system the economic basis of the state has changed. The unified state control structure has disintegrated and the share of private agricultural production has grown. However, in the conditions of sharp change in the continental climate of Kazakhstan, and natural and manmade hazards, there is an urgent need to change approaches to designing rural settlements and their management.

The basic requirements for agro-settlements should include the comfort of the spatial environment, sustainability, provision of modern production and the use of renewable energy sources. Such agro-towns should create opportunities for the local population that compete with those offered by the city [3].

In 2015, professors of the Faculty of Architecture of Kazakh Leading Academy of Architecture and Civil Engineering received a state grant, according to which scientific research is expected to be conducted for the *Development of Architectural-Planning Decisions of the Processing Enterprises of Agro-Industrial Complex of the Almaty Agglomeration*. In this scientific study, the participating students have an opportunity to develop the objects of agrarian architecture of a new generation.

For example, the project of an agro-industrial enterprise in the village of Shelek, Almaty region (Figure 1), focuses on the non-waste production process using biogas plants. The complex includes a farm, meat processing plant, greenhouses, glasshouse, logistics centre, solar and biogas power stations, parking lots, administrative centre, residential complex for workers and recreational spaces.

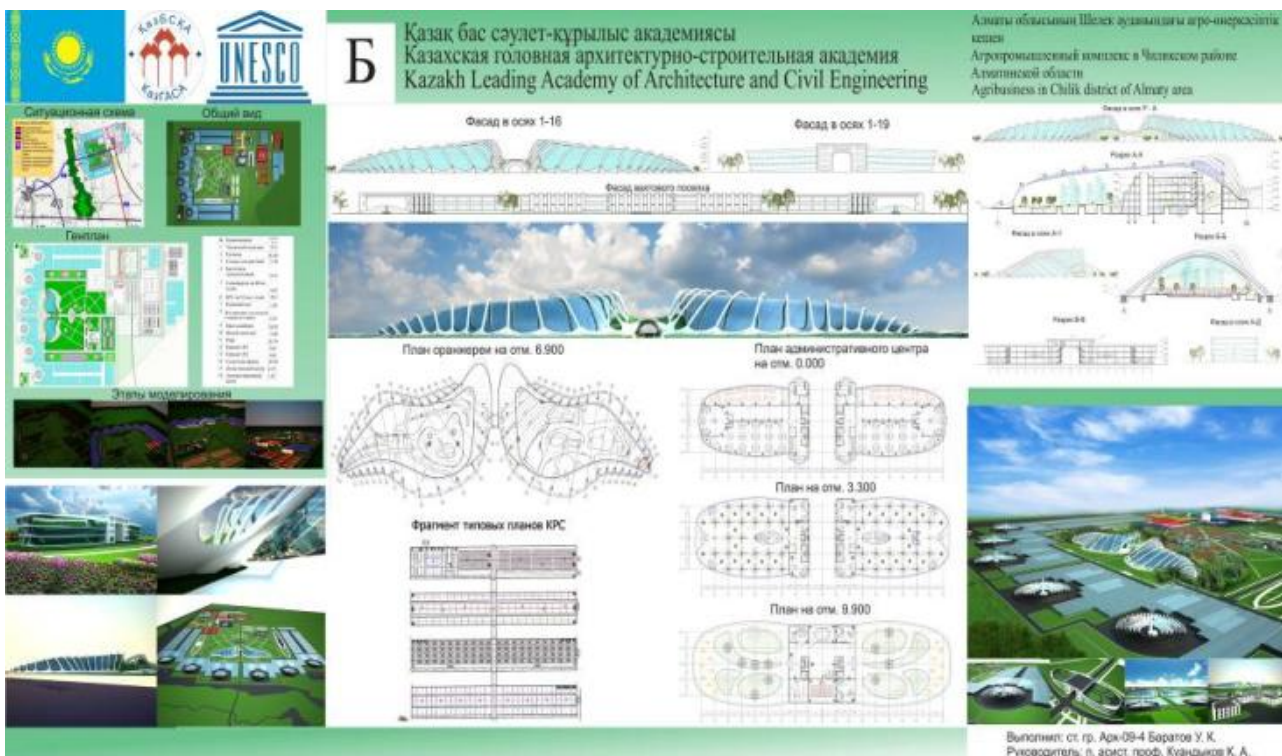


Figure 1: Agro-industrial enterprise in the village of Shelek, Almaty region (Student U. Baratov, supervisor K. Kuandykov).

Another project, *Agro-farm with Recreational Complex on the Lake Pervomayskoye near Almaty*, has a clear functional zoning in order to ensure effective interconnection of facilities in accordance with the technological process (Figure 2).



Figure 2: An agro-farm with recreational complex on the Lake Pervomayskoye near Almaty (Student M. Zhakeyeva, supervisor K. Kuandykov).

The purpose of the complex is cattle breeding, fish farming, cultivation of vegetables and fruit. The complex is supplied with energy by a biogas power plant running on the waste of pig-breeding. Given the landscape value of the territory, particular attention is paid to ecology, conservation of natural resources, gardening and landscaping.

## CONCLUSIONS

The inclusion of agricultural topics in the structure of educational architectural design is important for an agrarian country, such as Kazakhstan. Students in the process of learning embrace methods of design of modern types of agricultural buildings, get acquainted with relevant methods of production, and use eco-friendly and non-waste technology, and renewable energy in their projects.

The urgency of the problem, the state's interest, the variety of the typology of agrarian structures, the expansion of constructive-technical capabilities, all these give grounds to believe that the agro-industrial sector is a highly perspective direction in the development of architecture of Kazakhstan. Hence, architectural education is at the forefront of solving the agricultural sector's scientific and practical problems, using the latest innovative technologies.

## REFERENCES

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## BIOGRAPHY



Gulnara Abdrassilova qualified as an architect at the Alma-Ata Architecture and Construction Institute, Kazakhstan, in 1980. She acquired the scientific degree of the Candidate of Science in Architecture at the Kazakh Leading Academy of Architecture and Civil Engineering, Kazakhstan, in 2002, and the degree of the Doctor of Architecture in Kazakh Leading Academy of Architecture and Civil Engineering, Kazakhstan, in 2010. Since 1980, she has been working in the Kazakh Leading Academy of Architecture and Civil Engineering, Kazakhstan, as an assistant, senior lecturer, associate professor (1980-2000); Head of Department and Dean ((2001-2006); the Vice-Rector for External Relations (2006-2013); and presently as an academic Professor of the Department of Architecture. In 2015, she was in the top 50 university teachers of Kazakhstan. She was the winner of the Republican Competition of the Ministry of Education and Science of the Republic of

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