SECTION IV

Opportunities and challenges for education and research in agri-food sector

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Strengthening food safety through international training

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Summary

Food systems are positioned to be a primary driver of improved human and environmental health. This is both a big challenge and opportunity for Central Asian Countries where one of the major threats is the low level of food safety and quality. Agricultural sector continues to be associated with low competitiveness and productivity, suffering for to unsafe foods and products and inadequate private and public management system. Problems are linked with low expertise of the public and private professionals and with inadequacy in higher and vocational education and training systems. International cooperation in higher education and capacity building Erasmus+ projects in the field of veterinary sciences can accelerate the needed changes in Uzbekistan.

1 Research questions

According to the 2018 Global Food Policy Report, the world economic growth is projected to strengthen in emerging economies and the food systems are "uniquely positioned to be a primary driver of improved human and environmental health" [1].

This is both a big challenge and an opportunity for Central Asian Countries where one of the major threats is the low level of food safety and quality. OMS and FAO surveys found that in Kirgizstan, Uzbekistan and Tajikistan, the agricultural sector continues to be associated with the highest levels of informality and contributes to the important urban-rural disparities and internal migration that exist in the region. All the three countries continue to have a large share of small and micro enterprises, associated with low competitiveness and productivity. Food processing companies have difficulties to deal with legislative and commercial requirements, suffer due to unsafe foods and products and inadequate quality management system. Therefore, local population lost confidence in the domestic market, which rises public health concerns. The part of population living on agriculture is high but with a low and uncertain income due to the unguaranteed production and with difficulties to the market access [2]. International Organization and local governments have launched project and actions to support the development of this sector but few actions towards vocational education and even fewer toward higher education. Problems linked with low expertise of the public and private professionals are still important, aggravated by a lack of a shared overview of whole food supply chain. This is confirmed by the Torino process survey results (2016/17) that states that in spite educational level has increased steadily in most countries, this has not systematically resulted in greater employability, pointing to discrepancies between skills developed in the education and training systems and those required by the labor market [3].

2 Data and methods

Capacity building project, funded by Erasmus+ program showed a high potentiality in address similar situation and this work illustrates how BUzNet project dealt with the need in rising food safety competences. BUzNet is an Erasmus+ Capacity Building project, leaded by The University of Porto, which aims to improve the veterinary medicine high education teaching in Uzbekistan as a way to enhance local living standards applying better veterinary teaching and thus, better technical support for safer product reaching the general society [4]. The University of Pisa, partner of the project, in charge for the food safety and inspection sector, participated in the field survey in Uzbekistan and the successive Uzbek teachers training during their planned 2 weeks stay at the Department of Veterinary Science at the University of Pisa.

In order to provide a wide and deep insight of the European Food safety system and how it is applied into society, we based our survey and the following training on the five key elements of a national food control systems provided by FAO and OMS in 2003, represented by food law and regulation, food control management, inspection service, laboratory services and Information, Education, Communication and Training [4].

3 Main results

Survey performed during the project field visit showed that education and training in Public

health, food safety control and prevention of food borne disease, in spite of the recent enforcement, are still inadequate and not tailored for the specific needs, especially in term of food chain management. This lack has a direct rebound on the inadequacy in producing data, which should enable policymakers to set public health priorities, actions and allocate resources. This is of particular importance in a country like Uzbekistan where the development of the food industry had an acceleration in the last years but was not accompanied by the same growth rate of food safety. In this context, it is pivotal to provide modern education and training, taking into consideration the expected development of the agrifood sector.

During the training in Pisa, Uzbek teachers have been supported to develop skills and competences in food safety management systems, to improve the risk assessment, the monitoring of foodborne diseases and the food inspection and audit.

Through the enhancement and development of competences in higher education in food safety and strengthening the cooperation among universities, the needed changes can be accelerated. Trained people become a mean to disseminate and transfer information to students, teachers and policy maker in order to help in reshaping the higher and vocational education needs, set up scientific cooperation and contribute in reviewing the control systems.

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The role of investment in creating an added value chain in the agriculture

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Abstract

The article analyzes the strategic directions of sustainable development of the agrarian sector in Uzbekistan. Proposals on strategies for priority development of agrarian sector in the regions of the country have been developed

Key words: Region, strategy, strategic direction, agrarian sector, sustainable development, innovation, investment, cooperation, cluster, export potential, added value chain.

In Uzbekistan, over the past period, consistent measures have been taken to reform agriculture and introduce market forces into the industry.

In particular, a cluster method of production has been established in agriculture, the volume of agricultural fields allocated to clusters is made up of cotton-textile — 67 per cent, livestock — 8 per cent, fruit-vegetable — 7,5 per cent.

The processing of raw materials grown by the cluster method allows it to be delivered to the consumer in the form of a finished product.

In other sectors, such as fruits and vegetables, rice, livestock, silk, work is underway to create clusters that meet today's requirements.

It is necessary to take measures to sharply increase crop production to export $ 2 billion this year and 3-4 times more fruits and vegetables in the next 5-7 years.

This year, 3 trillion soums will be allocated for the development of fruit and vegetable growing, viticulture, seed production, animal husbandry, agro-logistics, widespread introduction of water-saving technologies, research and training of qualified personnel for the industry. In areas such as animal husbandry, astrakhan, fisheries, poultry, special attention will be paid to breeding, and new mechanisms of state support will be introduced[1].

Today, more than 80 types of products are grown in our country, and the country's agricultural products are exported to 66 countries. In 2010, the cotton fiber index accounted for 11.3 percent of exports, by 2018 this figure had gone down to 1.6 percent[2].

At the same time, in the field, especially in the development of fruit and vegetable growing and viticulture, effective marketplaces are not structurally regulated, and the inadequacy of the scientific approach leads to the fact that the existing network capabilities are not fully used.

According to calculations, it is possible to earn 7 times more grapes, 6 times more cherries, 5 times more nuts for cotton raw materials grown on an area of 1 hectare.

Based on decree no. PF-5853 " on approval Of the strategy for the development of agriculture of the Republic of Uzbekistan for 2020-2030" of president of the republic of Uzbekistan in October 23 in 2019, in the field of horticulture and viticulture is developing high-value products, increase exports, development of land use and the use of lalmi, cotton, reduced crops, export crops, and effective use of orchards, vineyards and greenhouses[3].

In total, 41 fruit and vegetable agricultural associations were established in 8 districts of Jizzakh, Samarkand, Tashkent and Ferghana regions.

Ministry of labor of the Republic of Uzbekistan, In order to provide employment for low-income families, the Council of farmers, farms and landowners of Uzbekistan, while attracting funds from international financial institutions, will create 31 agricultural associations in 22 districts of Ferghana, Andijan and Namangan regions in 2020 and in the Republic in 2021.

In the field of growing, processing and exporting fruit and vegetable and grape products, new measures are being introduced to develop a cluster and cooperative system. These are:

- the organization of clusters for the cultivation, processing and export of fruit and vegetable and grape products is carried out on the basis of a tripartite agreement between the initiative Council of Ministers of the Republic of Karakalpakstan and the regional akims and the Ministry of agriculture and food of the Republic of Uzbekistan;
- initiators of the organization of a fruit and vegetable cluster are usually selected from among processing and exporting organizations, based on their experience and capabilities. the Bund ensures, first of all, the commissioning of completely unused storage and processing facilities;

- fixing of vegetables and fruits and grapes of technical varieties of fruit and vegetable clusters will be performed by agreements on the supply of products made voluntarily between processing and exporting organizations with them and regional administration.

- participants of the fruit and vegetable cluster — the relationship between the organizations that grow, process and export products is regulated by the agreements on the supply of products;

- product delivery contracts are made on the basis of decisions on the placement of fruit and vegetable and grape products and the terms of the tripartite agreement be accepted on the basis of proposals of processing and exporting organizations by the Council of Ministers of the Republic of Qoraqalpagistan and will be registered by the regional and district villages;

- product delivery contracts are made on the basis of requirements of civil legislation, including the determination of the price of the product based on the actual cost, including providing plant growing with seedlings, seedlings, mineral fertilizers, fuels and lubricants and other resources at the expense of advance funds allocated for purchased products, provision of agrotechnical and agrochemical services, recommendations on the use of new innovative technologies, information and consulting services are implied.

Constructing of intensive gardens and vineyards, constructing of greenhouses in unused agricultural lands, low-yielding cotton and grain-free areas and giving them to people on the basis of leasing and credit terms by commercial banks and leasing companies, afterwards agricultural associations and fruit and vegetable clusters will be established on their basis[4].

Encouraging cooperative relationships is done through financial support for them, providing working capital through processing and exporting organizations in which the producers were party to the tripartite agreement, Loans of up to 20 billion soums will be allocated by commercial banks in order to create construction of new gardens, vineyards and greenhouses, creation of storage and processing facilities.

	January-December				**2018 as a percentage of January-December**
	2018 year		**2019 year**		
	tons	**Share in total production, percent**	**tons**	**Share in total production, percent**	
Fruits and berries	46934	31,7	48541	32,0	103,4
grapes	8265	21,0	9557	22,2	115,6

Table 1. The main types of agricultural products produced by farms in January-December 2019[5]

In Khorezm region, horticultural and viticultural clusters will be established in each district and products will be grown on the basis of value chains[6].

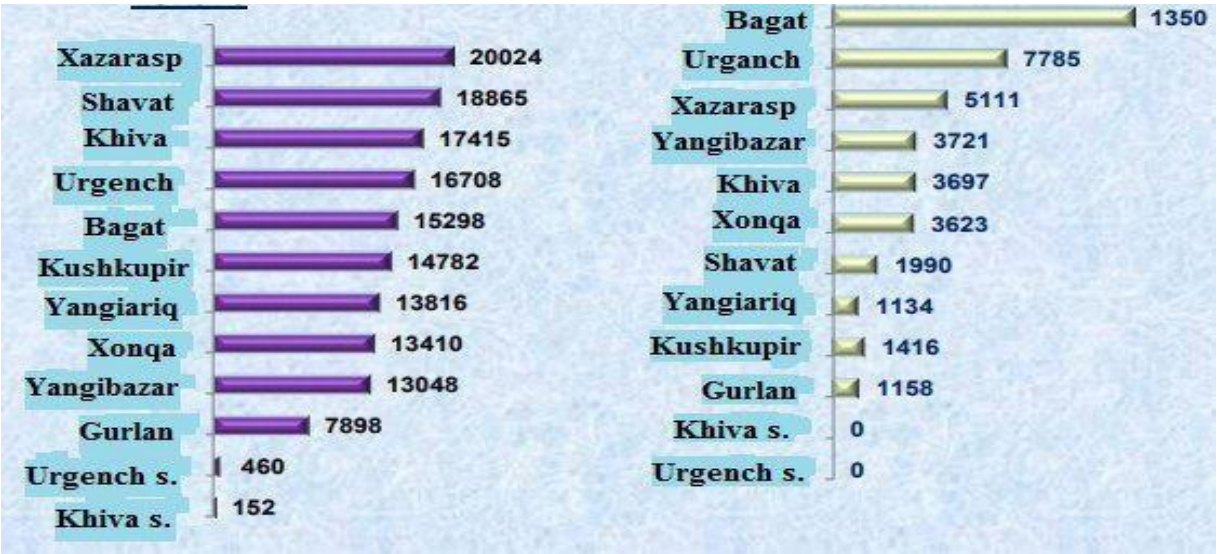

Figure 1. Proportion of fruits and berries and grapes in Khorezm region, tons[7]

In 2019, a total of 151876 tons of fruits and berries were grown in Khorezm region. In terms of districts, the largest share falls on Hazarasp district, the lowest share - Gurlan district. Grape cultivation in the region totaled 43,136 tons, and in terms of districts, their share is the highest in Bagat district and the lowest in Gurlan district. The main reason why Gurlan district has the lowest production of fruits and berries and grapes is that the district specializes mainly in rice cultivation.

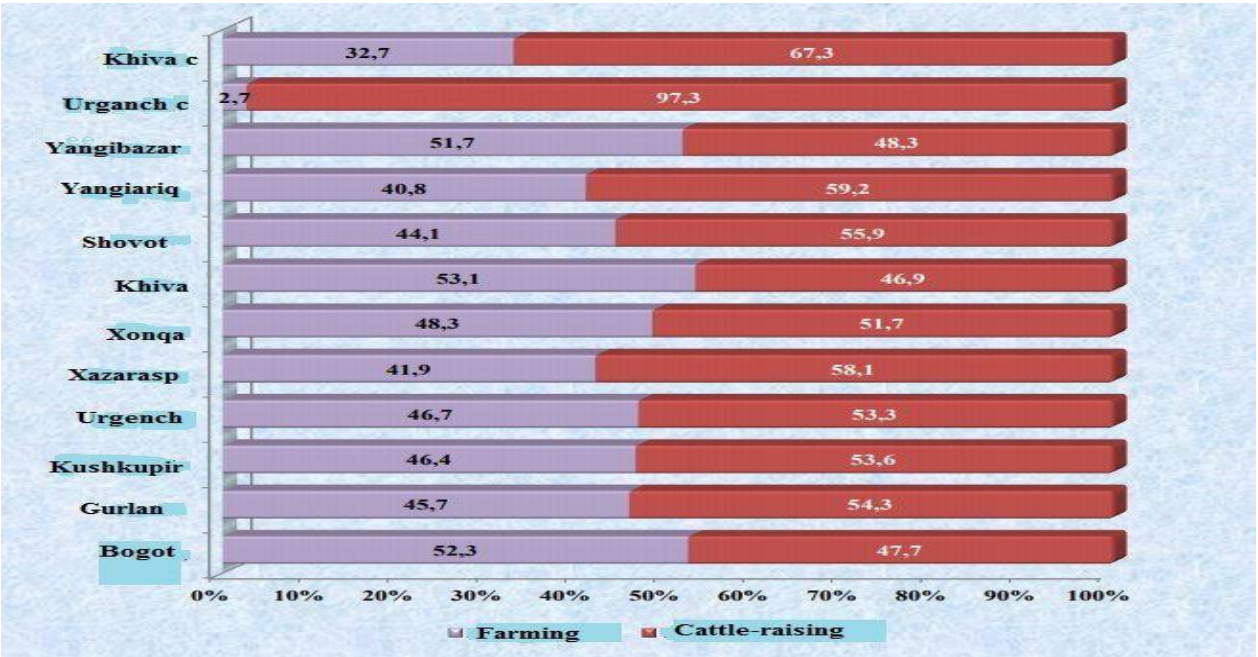

Figure 1. Distribution of the volume of agricultural production by regions[8]

In 2019, the largest share in agricultural production of Khorezm region was occupied by dehkan (personal auxiliary) farms, which in January-December 2019 amounted to 73.9% of total agricultural production (January-December 2018 - 76.8%), farmers farms produced 25.0% of agricultural products (21.9% in 2018), as well as agricultural enterprises produced 1.1% of total agricultural products (1.3% in 2018).

In our opinion, in order to implement the strategy for the development of the agricultural sector in our country, it is necessary to take the following measures:

- It is expedient to revise the procedures for state support of relatively new grain and fruit

clusters for the agricultural sector of Uzbekistan, including the simplification of the credit system, cost subsidies, land allocation;

- To implement the strategy, it is necessary to develop new sectors of agriculture and animal husbandry on the basis of innovative developments. According to our analysis, today only 35% of the annual fodder needs of farms are covered by local resources. To this end, it is necessary to strengthen the fodder base of livestock through the expansion of arable land through the development of new lands, as well as a sharp increase in food production through the development of fisheries and poultry;
- we have identified the biggest problem in the agricultural sector, farmers ’knowledge of agricultural technologies, modern production and innovation is insufficient. Therefore, it is necessary to develop programs for training and retraining of farmers, to introduce a system of regular study of the experience of advanced foreign countries in the field.

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There and Back Again. Uzbek Veterinary Lecturer Visits to Europe.

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Summary

The aim of this part of the BUZNET project was to immerse Uzbek veterinary lecturing staff in the experience of teaching and learning in a range of European veterinary schools, and to return with new ideas and examples of good practice that they could integrate into their professional lives and those of their home institutions. They were exposed to different methods of teaching and methods of assessment, research activity and how this is used to enhance and synergise the learning experience of students. They were also shown examples of how universities can increase their income streams, such as the provision of analyses of silage samples for farmers and feed companies, DNA analysis for animal breeders, and analysis of the quality of human foodstuffs, such as milk and cheese for dairy producers. Also presented in this regard was a visit to the Open university in Estonia, which provides courses for farmers and other external students, which are funded by attenders or by government.

There were two groups of Uzbek teachers that visited the EU Universities of Porto, Pisa, Padua and Tartu, five from each of the Uzbek partner Institutions. They stayed for about two weeks in each EU Faculty doing a circular itinerary visiting each of them. In Porto they saw all the facilities of the faculty (small and large animals) and spent a day in the National Reference Laboratory for Animal Diseases. They were also divided into small groups depending on their interest and followed the students in their activities (going out with the farm ambulance service, engaging in work on horse reproduction, surgery and clinical services as well all the activities in the small animals' clinic). During the work performed as students they were asked to produce clinical/surgical cases and later presented them to all their colleagues and also the relevant teachers (just as the local students must do). A special class of cheese production and control was organized, where they played the role of students performing all the activities that a regular student must do. In Tartu, the visiting lecturers saw the facilities, including laboratories, observed teaching sessions (undergraduate and postgraduate) including examples of both theoretical and practical sessions, observed PhD annual evaluation sessions, joined a discussion on project application and execution and joined a meeting on research collaboration with a UK veterinary school.

They discussed teaching and examination processes and curriculum development with the Director of Studies and attended an international conference on "Animal reproduction, technology and welfare". The visitors selected case studies from their visit which they researched and presented to their peers and Estonian colleagues. These included case studies on: Dairy cow welfare assessment, embryo transfer, feline castration observation and practice, included how students engaged, animal cloning and welfare, on-farm feeding systems and a description of dairy herd quality management services.

In Pisa they joined veterinary students on field experience in food processing plants and they attended practical classes delivered by experts in food inspection, food safety management and process control. Moreover, they were also involved in laboratory practice, in particular microbiological and chemical food analysis. They also had the opportunity to engage in dialogue with Officers of the Public Health System and were able to make a transparent comparison between the Uzbek and the European legislative and operative systems for food control.

The feedback from the visiting lectures from Uzbekistan was very positive, and these activities have enriched both their own professional expertise and enthusiasm, and also the experience and learning potential of the students at their home institutions.

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The main trends and expected changes in agricultural education in Uzbekistan

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ABSTRACT. Since national independence, the government of Uzbekistan is paying attention to developing its education system, including agriculture. A number of regulations have been adopted in order to address the problems in education. Among these, the Law on Education (1997) and the National Training Programme (1997) are the main two regulations adopted to address issues related to the national educational system of Uzbekistan. Nevertheless, a problem of a lack of qualified agricultural personnel in rural areas still exists, and the majority of young cadres try to find jobs in cities. Compared with undergraduate students, the share of graduate students wishing to continue their education (doing a PhD) was higher. The following recommendations are given: (i) agricultural vocational/professional colleges and agricultural universities should collaborate in teaching students. Also, college and university staff members should cooperate with industries and farmers to develop employment opportunities for graduates in rural areas. (ii) Economic incentives based on higher wages/salaries are very important to attract more qualified specialists to rural areas, hence policymakers should consider this issue in a broader way. Developing extension service organizations can be an option where qualified staff will be needed.
Keywords: Agricultural education, motivation, career expectations.

Introduction. Agricultural employers in Uzbekistan need highly qualified and motivated personnel. At the same time, students at agricultural universities seem to have little concrete idea of what to expect from a job in agriculture and tend to aim at business careers outside agriculture. The study examines the motivations, aspirations and career expectations of undergraduate and graduate students studying at agricultural universities.

Career planning usually starts during education, and the early career years are crucial for young people (Hall, 2002). Therefore, employers try to attract talented young graduates and develop these employees' capacities within their organizations (Gunkel et al., 2013). Especially career expectations, perceptions, motivations as well as knowledge and skills of students studying at vocational/professional colleges and agricultural universities are critical in the training process.

After national independence, the Government of Uzbekistan took steps towards updating its education system. A number of government regulations and acts were elaborated with the aim of developing the national education system. In particular, the Law on Education (1997) and the National Training Programme (1997) are the main two regulations which were adopted to address issues of the national educational system of Uzbekistan. Nevertheless, there is still a problem of a lack of qualified agricultural personnel, and the majority of young cadres try to find jobs in cities. The development of a modern system of agricultural education is impossible without an analysis of changes in the external environment and the various factors, which may influence the competitiveness of graduates in the labor market. Therefore, we think that this analytical study is relevant to address these issues. The aim of the study is to give an overview of career expectations of undergraduate and graduate students at agricultural universities in Uzbekistan.

The main trends and expected changes in agricultural education in Uzbekistan

Training of personnel for mass professions in agriculture of Uzbekistan was carried out by various organizations. The role of agricultural universities and technical schools was crucial in the preparation of qualified specialists. In the years 1928-1929, in agriculture of Uzbekistan, 285 persons had a higher qualification and 2485 a secondary education. From 1928 to 1930 the number of agricultural technical schools increased from 7 to 18 and about 400 agricultural specialists studied at these schools (Yunuskhodzhaev, 1991).

The following conclusions can be drawn from the study of agricultural education before the independence of Uzbekistan:

a) The period from 1920 to 1930 was crucial in establishing the education system of the country, including in agricultural education. The collectivization had a negative impact on the process of the formation of agricultural personnel due to insufficient organizational, material, technical and socio-psychological prerequisites.

b) Postwar (1946-1965) agricultural development in Uzbekistan can be characterized by

implementing a large-scale program of vocational training of rural people. Attention was paid to the increase in personnel majoring in mechanization and technical professions. However, the level of training of agricultural specialists, including chairpersons of collective farms and directors of state farms, was poor; they lacked qualified managerial skills.

c) From the 1960s to 1980s, the network of agricultural institutes and their branches was expanded, new faculties were established, and the contingent of students increased. In the beginning of the 1970s, the dominant position among the organizers of agricultural production was occupied by "practicians" - people who did not have the necessary education.

d) During the period from 1971 to 1990, training of personnel for agriculture had acquired not only economic but also political significance. Transition from planned to market economy, fundamental changes in rural areas, the need to transform the collective farm and state farm system and the formation of farms required the urgent development of a qualitatively new concept of professional training for cadres in agriculture.

After gaining its independence in September 1, 1991, Uzbekistan faced the necessity to reform its education system including agricultural education. Appendix A presents a chronicle of higher education reforms in Uzbekistan after 1991.

Ganiev et al. (2017) and Wegmarshaus (2017) explore the post-independence system of higher education in Uzbekistan. Ganiev et al. (2017) notes that the newly introduced curricula and topics in educational institutions were oriented to Western economic thought and theoretical and methodological concepts were based on principles of the market economy. According to Wegmarshaus (2017), changes in higher education system occurred in three areas: (i) the institutional structure involving the establishment of foreign university branches, (ii) curriculum reforms with a two-tiered graduation system, (iii) cooperation with international partners and participation in programs such as EU Tempus, Erasmus Mundus, Campus France, DAAD and others. The introduced two-tiered higher education system comprised a first level undergraduate education (*bakalavriyat*) in which fundamental knowledge on a specific subject area is taught (EACEA 2017), and a second level graduate education (*magistratura*) with a focus on a particular specialization. According to Wegmarhaus (2017), “Uzbekistan has not yet officially joined the Bologna process; hence no ECTS model has been introduced.”

The role of the National Programme for Personnel Training, which was adopted on August 29, 1997, is crucial and “provides a long-term strategy for strengthening education, developing a continuing education system and reinforcing the multi-level higher education system.” (EACEA, 2012).

The secondary special, vocational education with a three-year training period based on general secondary education is an obligatory, independent type of the system of continuous education and is carried out following the Law of the Republic of Uzbekistan "On Education". Academic lyceums and vocational/professional colleges represent the system of specialized secondary and professional educational institutions. They provide the necessary organizational, educational, methodological, and pedagogical conditions for realizing the goals and objectives of secondary specialized and vocational education.

The professional college (kasb-hunar kolleji) is a three-year secondary vocational school providing in-depth development of professional inclinations, skills and abilities of students, obtaining one or several specialties in selected professions. The academic lyceum (akademik litsey) is a three-year secondary specialized school providing intensive development of intellectual abilities, in-depth, differentiated and professionally oriented training of students.

The role of universities offering higher education in agricultural sciences was significant in the preparation of personnel in agriculture and related industries of the republic. There are four universities focused on education in agriculture and related sciences in Uzbekistan: Tashkent State Agrarian University, Tashkent Institute of Irrigation and Agricultural Mechanization Engineers, Samarkand Agricultural Institute[1], and Andijan Agricultural Institute[2]. In addition, Tashkent State Agrarian University has branches in Andijan, Nukus, Termez regions and Tashkent Institute of Irrigation and Agricultural Mechanization Engineers has a branch in Bukhara region.

Tashkent State Agrarian University (TSAU) was established on May 26, 1930 on the basis of the Agricultural Department of the Central Asian State University, as an independent Central Asian Agricultural Institute, which after a series of reorganizations in October 1934 was named Tashkent Agricultural Institute. Education is carried out through 17 bachelors and 41 master's specialties. TSAU has determined as basic institution for education "Farm management", "Agriculture, forestry and fishing", and "Agricultural engineering". In April 1991, the university, as the only one in Central Asia and Kazakhstan, received the status of an agrarian university. During its existence, the university prepared more than 64 thousand, and after independence, about 24 thousand specialists and bachelor and more than 1100 master students. Currently, 90% of teachers and 70% of students are actively involved in scientific research. The university includes an agricultural study and experimental station, as well as four research centers on plant biotechnology, biological plant protection, Agrotechnology Biomarkaz, and a fungi center.

Tashkent Institute of Irrigation and Melioration was founded in 1934 with its first two faculties – Hydromelioration and Mechanization. The institute was first established in the year of 1923 as a department of the prominent “Turkistan State University.” The institute was created under the technical faculty, and at that time it was named "Hydro technical engineering." Only 24 agronomists and 16 water conservation specialists studied at the faculty in the first year of its establishment. Later on, in 1929, under the faculty of "Melioration engineering faculty "a new department was opened. These two departments were linked in 1929, which led to the establishment of the "Central Asian cotton irrigation polytechnic university." On November 11, 1934, the "Central Asian Institute of agricultural industry irrigation and mechanization" and the "Central-Asian Cotton-Irrigation Polytechnic Institute" were merged and "Tashkent Institute of Agricultural Industry Irrigation and Mechanization" was established. After the Second World War, several faculties were established at the institute: "Construction" (1945), "Mechanization of irrigation" (1946), and "Hydropower" (1946). In 1974, a new faculty named as "Technology of repair of agricultural machinery and their creation" was opened. In 1979, other engineering departments were opened. On March 30, 2004, based on the decree #150 of the Cabinet of Ministers of Uzbekistan, the name of the institute became "Tashkent Institute of Irrigation and Melioration." Currently, the Institute has five faculties with 30 departments where 353 professors and teachers are employed, and more than 4800 students are studying.

The agricultural education and science of the southeastern regions of Uzbekistan were based at Samarkand Agricultural Institute (SAI), the oldest agricultural higher educational and research institution in Central Asia. The Samarkand Agricultural Institute was founded in 1929 on the basis of the Uzbek State Cotton Institute and the Uzbek State Zooveterinary Institute. From 1930 to 1933, the institute was named the Uzbek State Institute of Cotton Growing. In 1933, the name of the institute was changed to the Uzbek State Institute of Animal and Veterinary Medicine. From 1961, the institute was named the Samarkand Agricultural Institute. Currently, there are of six faculties and twenty-six departments engaged in the education of students in two levels of study: 17 BSc majors, 13 MSc specialties, including the following directions of education: agricultural sciences; veterinary medicine; zootechnics; economics and business; mechanization; and technology. Over the past period, the institute has educated more than 40,000 highly qualified specialists, over 4,500 managers and specialists were trained at the faculty for advanced training. More than 100 doctoral and 400 Ph.D. theses were successfully defended, of which 22 doctoral and 55 candidate dissertations were defended since the independence of Uzbekistan. Currently, 17 doctors of science and professors, 104 candidates of sciences and associate professors, and 360 senior teachers and assistants are working at 26 departments of the institute.

Andijan Agricultural Institute (AAI) is an agricultural university in Ferghana Valley, Uzbekistan. In 1964 on the base of Andijan branch of the Tashkent Institute of Irrigation and Agricultural Engineers, the Andijan Cotton Growing Institute was founded, which prepared engineers in mechanics, land melioration engineers, and agronomists. On February 28, 1992, according to the Decree of the first President I.A. Karimov, considerable attention was paid to agriculture, and Andijan Agricultural Institute was founded on the base of the Institute. Now the

Institute is preparing specialists in 14 directions of agricultural mechanization, management, accounting, and audit. There exist 13 chairs, which were founded based on the decree №415 of the Cabinet of Ministers dated September 3, 2004. Nowadays, 2,303 bachelor course students are studying in three faculties of the institute such as agronomy, mechanization of agriculture, economics and management. There are 530 staff members at the institute, 188 of which are professors and teachers; 80% of the teaching staff has scientific degrees, nine doctors of sciences and professors, 80 candidates of sciences. In 2011-2012, 363 students in 12 specializations were graduated from the institute and received their bachelor diplomas. The main objectives of the institute include the sustainable development of agriculture, application of resource saving, environmentally friendly agricultural technologies and protection of farm animals from different diseases.

Recent policies that are addressing reforms of agricultural higher education institutions are being focused to develop the aforementioned agricultural universities of the country. We think that further reforms should be elaborated carefully with stakeholders involved in agricultural universities.

Understanding students' preferences for working on a company as an employee or establishing their own company is important. Almost half of the BSc students from the natural science group and from the MSc students indicated that they want to establish their own business and the other half responded that they were planning to work as an employee in a company (Figure 3). Only 30% of BSc students from the social science group were ready to establish their own business. 70% wanted to work as an employee.

The results of analysis showed that the majority of students wants to work within the Samarkand region. The share of students wishing to work within Samarkand region was highest (68.7%) among BSc students majoring in social science (Table 8).

Among BSc students, 17.2% (43 respondents) from the group of natural science, 8% (12 respondents) from the group of social science and 10% (5 respondents) of MSc students chose other regions of Uzbekistan as a place to work. The share of students planning to work in cities of Uzbekistan ranged from 14.7% (22 respondents) in the group of BSc students in social science to 22% (11 respondents) among MSc students, whereas this was 18.4% (46 respondents) among BSc students from the group of natural science.

Regarding the difficulty of establishing their own business in the parental municipality, about 26% of BSc students from natural and social science and 38% of MSc students found it difficult (Figure 4). Further analysis showed that more than 80% of BSc students majoring in economics, technology, and veterinary sciences indicated that establishing their own business in the parental municipality is not difficult. According to the survey results, 73.3% (330 respondents out of 450) of all students were from Samarkand region, and almost 71% of students living in Samarkand region mentioned that establishing their own business in the parental municipality was not difficult.

To better understand students' perceptions regarding their career, students were asked whether they want to continue education or work, and if they chose work, what type of work they prefer. The analysis revealed that 28% of MSc students wished to continue their education which was slightly higher than among BSc students (Table 9). Moreover, the share of students who wanted to be employed in agriculture or agriculture-related industry was higher among MSc students (26% or 13 respondents), for BSc students from natural and social groups it was 19.6% (49 respondents) and 21.3% (32 respondents), respectively. Working in the manufacturing sector was most attractive for BS students, 30% (75 respondents) from natural science and 26.7% (40 respondents) from the social science group. Less attractive sectors for all students are found to be wholesale and retail trade, and services.

Regarding students' expectation of receiving an average monthly salary after graduation, the analysis of the results showed that students think to earn more as an employee changes the working place from rural towards urban areas and abroad (Figure 5). According to students' opinions, they expect to receive a monthly salary in the following amounts, depending on the

location of their work place:

(a) In rural areas of Uzbekistan: 18.4% of BSc students from natural science, 8% from social science and 20% of MSc students expect to receive up to 400 thousand Uzbek Som (UZS).[3] About 35% of BSc students from natural science and MSc students and almost 40% of BSc students from social science expect to receive from 400 thousand to 800 thousand UZS. 32.4% of BSc students from natural science, 41.3% from social science and 36% of MSc students expect to receive from 800 thousand to 1500 thousand UZS. The shares of students thinking to earn more than 1500 thousand UZS is small; 13.6% of BSc students from natural science, 11.3% from social science and only 8% of MSc students expect to receive over 1500 thousand UZS.

(b) In cities within Uzbekistan other than Tashkent: 2.6 and 3.2% of BSc students from social and natural sciences, respectively, and only 2% of MSc students expect to receive up to 400 thousand UZS. 28.4% of BSc students from the natural science, 18.7% from social science and 40% of MSc students expect to receive from 400 thousand to 800 thousand UZS. The percentage of students thinking to earn 400-800 thousand UZS is high. 52.8% of BSc students from social and natural sciences, 61.3% from social science and 40% of MSc students expect to receive from 800 thousand to 1500 thousand UZS. 15.6% of BSc students from natural science, 17.3% from social science and 18% of MSc students expect to receive over 1500 thousand UZS.

(c) In Tashkent: 1.6% of BSc students from the natural science, 0.7% from social science and none of MSc students expect to receive up to 400 thousand UZS. 9.6% of BSc students from natural science, 3.3% from social science and 10% of MSc students expect to earn from 400 thousand to 800 thousand UZS. 38.4% of BSc students from natural science, 64.7% from social science and 56% of MSc students to receive from 800 thousand to 1500 thousand UZS. 50.4% of BSc students from natural science, 31.3% from social science and 34% of MSc students expect to over 1500 thousand UZS.

(d) Abroad: 2.8% of BSc students from the natural science, 2% from social science and 4% of MSc students expect to receive up to 400 thousand UZS. 4.4% of BSc students from natural science, 0.7% from social science and 4% of MSc students expect to earn from 400 thousand to 800 thousand UZS. 12% of BSc students from natural science, 8.7% from social science and 24% of MSc students to receive from 800 thousand to 1500 thousand UZS. The majority of students from all groups expect to earn more money abroad, 80.8% of BSc students from natural science, 88.7% from social science and 68% of MSc students expect to over 1500 thousand UZS.

For a better analysis of incomes of the population in the parental municipality, students were asked whether paid salaries were sufficient. Among BSc students, 26.4% (66 respondents) from natural science, 28.7% (43 respondents) from social science and 22% (11 respondents) of MSc students indicated that salaries in their parental municipality were not sufficient (Figure 6). On the other hand, most students chose sufficient: 60.4% (151 respondents) of BSc students from natural science, 62.4% (93 respondents) of BSc students from social science and 66% (33 respondents) of MSc students mentioned salaries as sufficient. The shares of students who indicated salaries as “sufficient, even can save” were small, 13.2%, 9.3% and 12% for BSc

According to the questionnaire, students were asked if they liked the idea to be offered a job as a qualified specialist on a farm in rural Uzbekistan with fair payment. Compared to BSc students, most of MSc students responded that they agreed with the offer, a minority disagreed, 68% (34 respondents) versus 8% (4 respondents) (Figure 7). Among the BSc students, 60% (150 respondents) from natural science and only 46% (69 respondents) from social science agreed to the offer, and 15.2% (38 respondents) and 20% (30 respondents) disagreed. The shares of students who had no idea were 24.8%, 34%, and 24% for BSc students from natural, science, and MSc students, respectively.

It is interesting to investigate the factors which influenced students in choosing to study at SAI. Therefore, students were asked several questions related to their choice of studying at SAI. A majority of BSc and MSc students indicated that they wanted to study in the university from childhood: 42.4% for BSc students from natural science, 45.3% for BSc students from social science, and 44% for MSc students (Figure 10). A significant share of undergraduate and graduate

students mentioned that they wanted to work in a governmental position: 31.2% of BSc students from natural science, 37.3% of BSc students from social science, and 30% of MSc students. Among the BSc students, 16.8% from natural science, 9.3% from social science and 8% of MSc students chose "influence of the family." A few numbers of undergraduate and graduate students mentioned that they did not think about a career.

We assume that career planning, adaptability to employment conditions, and understanding job market trends are all relevant factors which will influence students' future careers.

A large number of students mentioned that they have not made a career choice yet or were undecided. Students agreed that they did not feel particularly concerned or worried about their career. At the same time, students mentioned that they could adapt to changes in the world of work. Not many students think that they get excited when they think about a career, i.e., they feel undecided. Students tend to not fully understand the job market. Among all students, BSc students from the social science group were less decided than those from natural science and MSc students about planning their career.

Thus, we can draw the following conclusions from the analysis of students' career planning:

(a) In general, the analysis revealed that among the 450 students surveyed, only 20-30% of respondents think that establishing their own business was difficult which may indicate that there is a sufficiently enabling environment for business opportunities.

(b) Compared with BSc students, the share of MSc students wishing to continue their education (doing PhD) was higher; moreover working in the agricultural sector was more attractive for MSc students. Perhaps, this can be explained by the fact that the majority of surveyed MSc students were from rural areas.

(c) A majority of students expect to earn more as the working place changes from rural towards urban areas and abroad.

(d) More than 60% of BSc and MSc students responded that the salary paid in their parental municipality was sufficient. Compared to BSc students, most of MSc students were ready to work on a farm as a specialist if they were offered a job as a qualified specialist on a farm with fair payment. Regarding students' opinions about 5 year planning, MSc students would see themselves working in their home regions.

We assume that rural living conditions are crucial for students since a majority of surveyed students were from rural areas. For a majority of students, the most essential factors are found to be employment opportunities, the unemployment rate, the wage level, the cost of living, healthcare and educational provisions, the presence of friends and relatives, the quality of roads, pollution level, and climate conditions. According to students' opinions, other factors were also of no small importance. Less critical factors were the time needed for traveling to work, the cost of rented private accommodation, or violent crime levels.

Professional development is a key factor for capacity building. According to the results of the survey, students evaluated all services as satisfactory (Figure 13), which means that for conducting educational and training activities SAI had all necessary facilities. The availability of services at SAI can be explained by the fact that recently, more staff members started to participate in several educational and scientific projects, and their capacities significantly increased. Moreover, due to these projects, faculties, departments and the library were provided with modern computers and other necessary equipment. Besides, more students started to learn foreign languages and are using the internet for educational purposes, which became available for all staff members and students of SAI.

Conclusions

The current agricultural education system which was established during the former Soviet Union underwent many reforms. We studied the development of agricultural education and the underlying policies in the pre- and post-independence periods. While the former was strongly linked to the Soviet political system aimed at the provision of agricultural personnel in rural areas, the latter was oriented towards Western economic thought, based on principles of a market

economy.

Although the adoption of the two main legislative regulations (Law on Education (1997) and National Training Programme (1997)) were important steps in updating the national educational system of Uzbekistan, employment problems of graduates were not well studied and the analytical study tried to fill this gap.

The analytical study focused on the motivation, aspirations, and career expectations of undergraduate and graduate students of agricultural universities on the example of Samarkand Agricultural Institute. It allows us to draw the following conclusions:

1) The role of government in higher education, including agricultural higher education, is significant. Higher education institutions lack independence in decision making related to their development. Nevertheless, the government is adopting many acts and regulations to develop and increase the ranking of its national education system.

2) Survey results revealed that almost half of the BSc students from the natural science group and MSc students indicated that they want to establish their own business and the other half responded that they were planning to work as an employee in a company. In addition, the majority of students who wanted to establish their own businesses preferred to open these businesses in their parental municipalities, which may indicate that there is a sufficient enabling environment for business opportunities. On the other hand, 30% of BSc students from natural science and 26.7% from social science preferred to work in the manufacturing sector, and only 19.6% and 21.3% wanted to work in agriculture.

3) Since the majority of SAI students are from Samarkand region, most of them wanted to find jobs in the Samarkand region. Students from other areas prefer to be employed in their parental municipalities.

4) Surveyed students are aware that wages abroad are much higher. However, most students want to find jobs in Uzbekistan. We think that having graduates wishing to work in Uzbekistan is very important for the future of agriculture.

We also offer the following recommendations:

According to our results, there are students among the respondents who have not decided about their careers or they do not have sufficient knowledge concerning career planning. Therefore, agricultural vocational/professional colleges and agricultural universities should pay more attention to teach students competences related to career planning. Moreover, college and university staff members should cooperate with related industries and farm managers for developing employment opportunities of graduates.

Based on the survey findings, economic incentives are very important to attract more qualified specialists to rural areas, and policymakers should elaborate policies aimed to absorb these graduates with reliable wages. In this regard, developing extension service organizations with qualified staff in rural areas can be one option which should be based on private public partnerships. In addition, rural infrastructure improves the working and living conditions for graduates from agricultural universities and should thus be maintained.

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Environmental, socio-economic aspects of climate change in the aral sea and their impact on flora and fauna

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Abstract: the Aral sea is located in the arid zone and is a huge continental reservoir – a drainless salt lake. This lake, located on the territory of Kazakhstan and Uzbekistan, is one of the largest continental reservoirs on the planet. Until the 1960s, it was the fourth largest water mirror in the world after the Caspian sea, the North American Great lakes, and lake Victoria in Africa. Due to the three-decade-long regression of the Aral sea and its consequences, which are disastrous both for the nature of the region and for the population, this reservoir has attracted the widest attention in recent years.

Keywords: Aral sea, fauna, flora.

Introduction. The level and salinity of the Aral sea, as well as other reservoirs of the arid zone, are closely dependent on its water balance, which is unstable and depends not only on climate, but also on anthropogenic factors. The water balance of the Aral sea consists of fresh water from the Amu Darya and Syr Darya rivers (the main source), precipitation, underground runoff, and evaporation losses, which are extremely high here. The salinity and level of the Aral sea were initially determined by local (local) climate features that caused changes in river flow. During the historical period, the influence of human activity on the amount of river flow (mainly through irrigation, wars, economic and political decisions) periodically increased, becoming the main cause of its fluctuations**.**

In the period from 1911 to 1960 The Aral sea was in a quasi-stable state, and its level remained relatively stable. The current regression of the Aral sea began more than 50 years ago, in 1961. Its main reason was the extensive growth of irrigated acreage in the Syr Darya and Amu Darya basins. The balance between incoming and outgoing components of the water balance of the Aral sea has been lost due to a sudden increase in withdrawal of flow of the rivers Amu Darya and Syr Darya for irrigated agriculture. Violation of this equilibrium has led, since 1961, to the regression and salinization of this giant salty continental reservoir. Initially, these processes were relatively slow, but over the next decade, drying and salinity growth accelerated. Due to the peculiarities of the morphological structure of the Aral sea basin, the smaller, relatively separate Northern part, the Small Aral sea, and the deeper southern part, the Large Aral sea, were separated by about. The Kokaral. After the fall of the level by 1989 the Straits connecting them dried up, the Northern part of the Aral sea completely separated from the southern one, and two independent water areas appeared. Almost the entire flow of the Syr Darya began to flow into the Small sea, and the salinity in it stabilized and then began to decrease, since the total flow of Syr Darya waters exceeds evaporation. In the Big sea, the level continued to fall, and the salinity continued to increase. To date, three residual hyperhaline reservoirs have formed on the site of the Big sea. Changes in the species composition of the fauna of free-living aquatic invertebrates of the Aral sea began in the XX century even before the beginning of its modern anthropogenic regression. They were the result of deliberate human introduction of a number of invertebrate and commercial fish species that were initially absent in the Aral sea in the interests of fisheries, in order to increase the productivity of the sea in this way [3].

Not all planned introductions of invertebrates and fish to the Aral sea were sufficiently justified. Because of this, some of these planned introductions were at best unsuccessful, and at worst led to undesirable and even very serious negative consequences. In several cases, a number of species of fish and invertebrates came to the Aral sea along the way, as an "admixture" to the planned invaders. Almost all of these random invaders, naturalized, had a negative impact on the fauna of the Aral sea. We have the opportunity to observe the unique process of the disappearance of a giant reservoir – the Aral sea-before our eyes. The study of this process is undoubtedly of great scientific and practical interest. Man inadvertently set up a long-term experiment on this gigantic reservoir and the surrounding region that has never been seen in its scale. The Aral sea can be considered as a huge natural laboratory. In such a "laboratory" it is possible to study the entire complex of negative consequences of ill-considered human intervention in the natural regime of a large continental reservoir, which led to its rapid regression, intensive salinization of waters and biota degradation.

At the same time, the expediency of concentrating efforts on the protection of the Aral sea region in the social and natural direction was confirmed. The governments of Kazakhstan and Uzbekistan have adopted a number of decisions and implemented projects that have significantly stabilized the situation in the Aral sea region and continue to develop it in the direction of significant progress and increasing both the life and natural potential of these territories.

Purpose of work. The impact of global environmental changes is considered as a complex of impacts that reduce the level of planetary conditions for supporting life. One of the ecosystem disturbances is the drying up of the Aral sea. As is known, local changes in the quality of the environment in the Aral sea region are becoming global, which makes it necessary to study this problem.

Materials and methods. Over the past half-century, the Aral sea has almost turned into a dead sea. From 1960 to 1988, the volume of water abstraction as a result of the development of new land by farmers doubled. This led to a sharp reduction in the flow of water in the lower reaches of the rivers, and the sea was divided into the Northern part (the Small sea) and the southern part (the Big sea). The level of the Aral sea dropped by 22 meters, the volume of water decreased tenfold, the salinity of the water reached about 70 g / l (that is, each liter of water contains 70 grams of minerals).

The Aral sea has much less water than it is lost during evaporation, as a result of which the water volume of the lake-sea decreases, and the salinity level increases (Fig.1.).

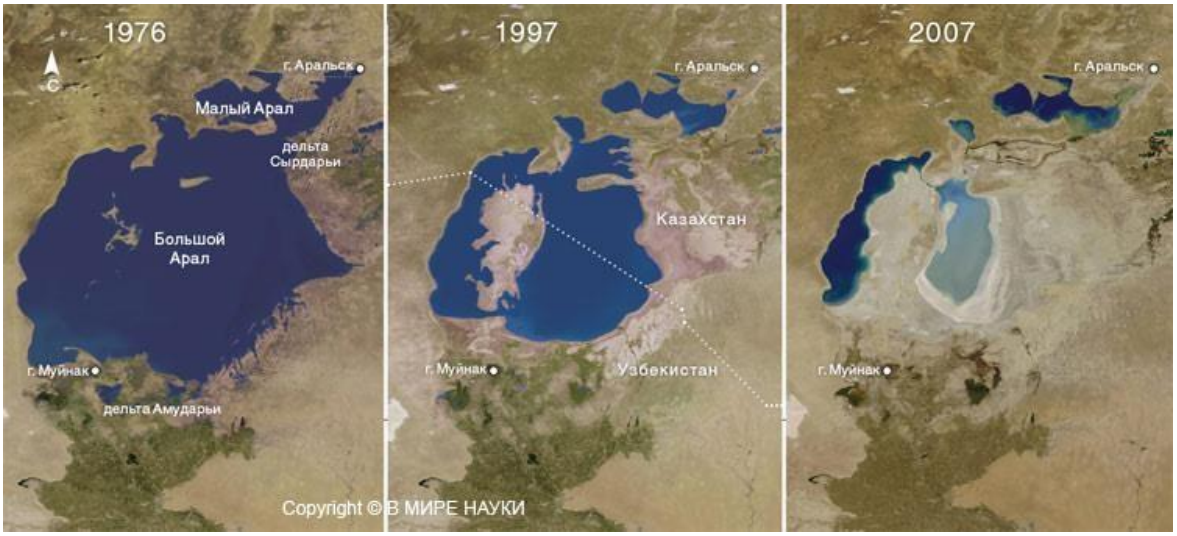

Fig. 1. Degradation Of The Aral Sea.

By the 90's, when the international Fund for saving the Aral sea was created, in many places the sea retreated from its old shores by 100-150 km [8].

More than 6 million hectares turned into a salt desert, became a source of removal of mineral aerosols into The earth's atmosphere. Tens of millions of tons of salty fine dust, toxic aerosols and toxic salt and sand rise from the sea floor every year, forming salt and dust clouds that are transported over colossal distances. They fall on irrigated fields, pastures, gardens, reduce their productivity, withdraw from agricultural turnover, worsen the environmental situation, and have a negative impact on the health of the population. All this has led to a sharp reduction in fish resources, and once 200 species of fish lived in the waters of the Aral sea. By the way, about 60 thousand people were once engaged in fishing.

The number of fish species that lived here decreased from 32 to 6-the result of increased salinity of the water, loss of spawning grounds and feeding areas (which were preserved mainly only in river deltas). If in 1960 the catch of fish reached 40 thousand tons, by the mid-1980s local commercial fishing simply ceased to exist, and more than 60 thousand related jobs were lost. The most common inhabitant was the black sea flounder, adapted to life in salty sea water and introduced here in the 1970s. However, by 2003 in the Big Aral sea, it also disappeared, unable to

withstand the salinity of water more than 70 g / l — 2-4 times more than in the usual marine environment [2; 7].

With the lowering of the water level in both parts of the Aral sea, the ground water level also fell, which accelerated the process of desertification of the area. By the mid-1990s, instead of the lush greenery of trees, shrubs and grasses on the former seashores, only rare bundles of halophytes and xerophytes were visible — plants adapted to saline soils and dry habitats. At the same time, only half of the local species of mammals and birds have been preserved (Fig.2).

Fig. 2. Reduction of fauna and flora in both parts of the Aral sea

Within 100 km from the original coastline the climate changed: it became hotter in summer and colder in winter, reduced the level of humidity (respectively decreased rainfall), decreased the length of the growing season, most were observed drought.

Only in 2018, on may 26-29 and July 17-18, catastrophic salt storms were observed in the region, covering the territories of the Kyzylorda region, the Autonomous Republic of Karakalpakstan (Uzbekistan) and the Dashoguz velayat (Turkmenistan), which are located in the lower part of the ancient rivers of Central Asia [4].

In this region, to produce high yields of cotton, rice and other agricultural crops, a large amount of mineral fertilizers and pesticides are introduced into the soil, some of which do not even decompose in nature and therefore pose an even greater danger to humans. All this mixture of pesticides and herbicides from the fields with water gets into the Amu Darya and Syr Darya, and hence into the Aral sea, seeping into the ground and underground water that is used for drinking and household needs.

And this is poisonous air and water, spreading salt dust that covers the high-altitude glaciers that give rise to many rivers. Within the range of the Aral sea-the territory from the Tien Shan in the East to Scandinavia in Western Europe.

As of the first half of 2018, the level of decentralized water supply is still significant and reaches 33.8%, about 12% of the tap water delivered to the population does not meet sanitary and chemical standards and 3.9%-microbiological standards.

According to medical experts, the local population suffers from a high prevalence of respiratory diseases, anemia, throat and esophageal cancer, as well as digestive disorders. Liver and kidney diseases have become more frequent, not to mention eye diseases [1].

The influence of the Aral sea on the territory's climate is local. A decrease in the level of the Aral sea entails a change in all components of the natural environment: climate characteristics gradually change, the air temperature increases in spring and summer, and decreases in autumn and winter: January temperatures decrease by 1-2 0C,July temperatures increase by 2-2.5 0C, which contributes to an increase in the continental climate. A noticeable mitigation of climate aridity occurs on the Islands and the sea coast. It has a somewhat softening effect in winter: the air temperature in winter is 1 -2 0C higher on the coast than away from the sea. A decrease in the area of the sea and its volume leads to a drop in the reservoir's heat reserves, a decrease in winter temperatures in the coastal zone and above the sea. The influence of the sea on humidity and its distribution is most noticeable in summer. The sea area also affects the wind regime, mainly its speed [6]. Most of the year, winds of North-Eastern points dominate, their frequency ranges from 20-25% with an average speed of about 5-6 m / s. In January, the frequency of North-easterly

winds is 24-32%. Winds from other directions are rare, and their frequency does not exceed 10-14%. The average speed is about 5-6 m / sec. The maximum speed is 20-24 m / sec. The number of days with strong winds reaches 14. Especially strong winds reach during the occurrence of a storm cyclone over the Aral sea with North-Western incursions of cold air masses [14]. In the coastal zone, breezes are often observed. In the spring, North-easterly winds mainly prevail in the North-Eastern part of the sea and on the coast,but their frequency decreases to 20-22%, while the frequency of winds of Western points increases. Average wind speeds in the prevailing directions are 5-7 m/s. In summer, northerly winds prevail in the middle part of the East coast and on the Islands, with an average speed of 4-5-6 m/s. In autumn, North-easterly and easterly winds prevail over a larger area, and their speeds increase compared to summer. High frequency of strong winds on the Barsakelmes Peninsula - 44 days a year. Strong winds are less frequent in the areas adjacent to the sea. As a result of the influence of the Aral sea, fogs are intensively developed. The main time of year during which fogs are observed is the winter months, in the spring - March, in the fall-October, November.

Conclusion.

The measures taken made it possible to replenish the water level in the Aral sea and revive the fishing industry. Kazakhstan has managed to preserve the Northern part of the Aral sea, improve the safety of hydraulic structures, reduce emergency indicators, and improve the state of wetlands in the lower Syrdarya river. But the work must continue. Only in 2018, in may and June, two salt storms occurred in the Aral sea region, which caused damage to agriculture and public health.

Long-term, environmentally sound solutions will require not only major investment and technical innovation, but also fundamental political, social and economic transformation.

Since the Foundation Of the international Fund for saving the Aral sea (IFAS) in 1993, we have been actively working with donor countries, UN structural organizations and international organizations.

All this provided the basis for a successful Donor conference in Paris on 23-24 June 1994, organized with the financial support of the world Bank.

Thanks to the countries ' desire for mutual cooperation, three programs of the Aral sea basin (pbam) have been successfully implemented during the 25-year activity of IFAS, and the Fund has become a reliable partner of the UN in achieving the goals of sustainable human development 2015- 2030.

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The role of the international project BUZNET in improving veterinary education in Uzbekistan

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Annotations

BUZNET (B-Learning Uzbekistan Veterinary Network) is an international educational project aimed at developing animal husbandry and veterinary medicine in Uzbekistan, ensuring food security and training competitive personnel in this area that meet international standards. The main goal of this project is to develop professional skills and practical skills among students through the formation of curricula in the sphere of veterinary, zootechnical and veterinary-sanitary examination, food safety education based on world experience, further improving the quality of education, and meanwhile improving the quality of practical and laboratory classes.

Key words. BUZNET project, international cooperation, hand-on practical education in veterinary medicine.

Introduction. Today one of the most pressing problems is the training of educated, highly qualified and, of course, experienced personnel to maintain an epizootic balance, protect the population from anthropozoonotic diseases, protect agriculture and domestic animals from various diseases, and strengthen control over the quality of animal husbandry and agricultural products. It is not a secret for anyone that today there is a shortage of personnel in this area, the presence of problems in training in this area, insufficient qualifications of existing personnel as specialists in modern, developed countries.

Decree of the President of the Republic of Uzbekistan dated May 8, 2018 №. PK-3703 “On the establishment of the Samarkand Institute of Veterinary Medicine” on the basis of improving the education system, expanding cooperation with leading foreign higher educational and research institutions and paying special attention to research. To ensure the implementation of the tasks set in this resolution, the Samarkand Institute of Veterinary Medicine, the Tashkent State Agrarian University and its Andijan and Nukus branches, in cooperation with the European University of Pisa, Padua, Porto and Estonian University of Life Sciences, have implemented the international educational project BUZNET for 2017-2020. Elaborated plan concentrated on shortcomings and problems in this area and solving them via this project in detail by European experts, appropriate recommendations and making a proposal, and also taking a number of measures to improve curricula and teaching methods, train specialists and ensure the integration of science, education and industry.

Main part. The main purpose of this project is to radically reform the existing system of veterinary education in the country on the basis of veterinary education in European countries, to develop and introduce new curricula, teaching methods, improve the qualifications of teachers and improve practical assistance to farmers and livestock breeders. In this regard, our country was visited by qualified professors - project managers and experts from partner universities in Europe, who conducted a monographic survey and a survey of experts to identify existing problems and shortcomings in the veterinary sphere and the veterinary education system. In addition, it was conducted survey among 5 categories of people (professors, students, veterinarians working in government agencies, farmers and employees of milk processing enterprises), covering all regions of the country. Based on the results of observations and surveys, new curricula and teaching methods have been developed to ensure the development of veterinary education based on world standards. A total of 20 professors from 5 participating higher education institutions in the country were then selected through a competition and gradually sent to the European partner universities for two-month training courses to improve their qualifications. These courses are ideally organized by professors from partner universities in Europe and cover all areas such as animal husbandry and applied veterinary matters, food safety and the study of advanced teaching technologies in this sphere.

Professors and teachers of the University of Pisa in Italy who organized training seminars on food safety, production, storage and quality control of milk and dairy products, according to the seminars of Professor R. Nuvolonni “Technology of milk and dairy products”, Professor R. Moruzzo “Certification of products in the dairy industry”, Professor A. Guidi “Quality control of dairy products”, Professor F. Pedonese “The role of fermenting bacteria in cheese production”

lectures and Professor F. Diakovo seminar “The importance of using case study in teaching natural sciences”, all participants learned about food safety.

The course at the University of Padua in Italy focused on the impact of the prevention of reproductive diseases in cattle on farming. The University of Padua organized lectures on the following topics: Professor S. Romagnoli “Identification and importance of estrus in cattle on industrial and small farms”, “Improving the health and reproductive characteristics of cattle”, “Implementation of new modern teaching methods in teaching veterinary clinical sciences” and “Diseases of the prostate gland in dogs” Lecture by Professor A.Mollo on “Effective methods for the detection of pregnancy in cattle and its importance”, “Satellite retention and the effect of plyometric disease on cattle reproduction”, lecture by Professor S. Steletti “Implementation of high technologies in dairy farming”, lecture by Professor V. Giaccone “Listeria and listeriosis, quality control of dairy and meat products” and practical exercises on the study of reproductive organs of cattle and remove of zygote from the uterus during the Internet embryo transfer and all of seminars and lectures were interesting for participants.

The Tartu University of Life Sciences in Estonia organized practical training mainly on animal care, feeding and their health, as well as on quality control of milk and dairy products. And also acquainted with the activities of the Republican laboratory for quality control of dairy products, the experimental animal farm of the university, the faculty veterinary clinic, the faculty of feed quality control and the genetic engineering laboratory. In addition, the university presented the principles of keeping and feeding cattle by Professor David Arney, and also participated in lectures and seminars such as endocrinology of small domestic animals and embryo transfer, interesting lectures and master classes by Professor Arno Virni on the topic “Organization of veterinary events in proteinuria in livestock farms”.

Practical exercises were organized at the Eben Salazar Institute of Biomedicine at the University of Porto, mainly in a large animal clinic and a food safety laboratory. In the large veterinary clinic of the Institute, scientific activities are carried out on the diagnosis and treatment of diseases, animal reproduction, a mobile veterinary service. At the clinic, the participants were divided into 3 small groups each day to attend classes and complete practical tasks for diseases of cattle and horses. He also visited the suburban small cattle and equestrian farms with the professors of the institute and used the Uzi apparatus to determine the fertility of cows, X-ray diagnosis of equine diseases in horses, diagnosis of tuberculosis and brucellosis in cattle, surgery in cattle and horses, and diagnosis and treatment of reproductive diseases in cows. was found.

The participants were greatly interested in the practical lesson “Technology of cheese making” in the Laboratory of Food Technologies and Safety of the Veterinary Department of the Institute of Biomedicine named after Eben Salazar. In addition, within the framework of the milk quality assessment program, practical exercises were conducted on the technical and clinical examination of milking machines and cows. The participants were introduced to the activities of the National Veterinary Research Laboratory in Porto.

The new scientific information obtained during the training was provided by the participants to the professors and students of the institution, and was introduced directly into practice and the educational process. Firstly, about 100 new publications on this topic were brought, and the library of the Institute was replenished with new literature. On the basis of translations of these literatures, professors and teachers of the institute publish literature of a new generation. Educational materials obtained during training were introduced, the use of presentations in the educational process of students, methodological manuals and articles were published. The participants organized seminars and discussions. The improved curriculum and discipline framework within the project is now taken into account as a model in the design of curricula in the field of veterinary medicine, animal science and veterinary-sanitary examination. Currently, the project is working to improve the material and technical base of the institutes by equipping each educational classes with modern computer labs, veterinary and surgical equipment and consumables for the educational process, as well as a complete set of laboratory equipment for milk quality control.

Conclusion.

1. Veterinary education programs at European universities are fully developed and trained through the preparation of a 5-year bachelor's degree, a 2-year master's degree and a 5.5 – year integrated master's degree.
2. Students of the Faculty of Veterinary Medicine study general subjects for the first 3 years, and in the last 2 years they continue their studies in 3 areas: small pets, large animals and horses and food safety.
3. These universities are accredited by the European Commission for Quality Control in Veterinary Education every 5 years.
4. Senior students have the opportunity to undergo an internship not only in the country, but also in Europe and other developed countries.
5. During the teaching veterinary medicine, the number of students in practical classes is organized into groups of no more than 15 people, and all students have the opportunity to perform laboratory work and direct manual examination in clinical examination and surgery.
6. The educational process in the sphere of veterinary medicine at all universities is fully equipped with a material and technical base, instruments, control equipment, a microscope, laboratory and farm animals, reagents and other tools and equipment's which are necessary for the courses.
7. All classes are fully equipped with modern multimedia equipment, which directly connected to the Internet, for analyzing topic's news.
8. Topics of all disciplines are devoted to problems of production, and also in classes studies the most modern methods of diagnosis and treatment of animal diseases in real practice.
9. Veterinary education is based on the creation of small and large animal treatment clinics, experimental farms, high-tech livestock farms, mobile veterinary services, modern laboratories and the direct participation of students in the entire process.
10. The interaction between local farms and manufacturing enterprises and the university is direct, and education and production are fully integrated into both teaching and research.
11. The results of this project have been widely used in the preparation of new curricula, qualification requirements for veterinary medicine in Uzbekistan, and regulatory and legal agreements are concluded with higher authorities to extend the training period in this area by at least 5 years.

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