

Labor Market Requirements Survey on the Need For Food Safety and Quality Specialist/ Managers in the Food Production Industry

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**Labor Market Requirements Survey on the Need For Food Safety and Quality
Specialist/ Managers in the Food Production Industry**

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Contact Information

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If you have further questions regarding the survey, please contact the SQIL project and consulting firm PMO.

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Foreword

This document is a labor market study for food safety and quality specialists conducted by PMO Business Consulting from December 14, 2020 to February 15, 2021. The report is divided into two main parts: an overview of the labor market and educational programs. The labor market overview describes the main participants in the labor market of food safety and quality specialists, the main functions and responsibilities of food safety and quality specialists, the process of finding them, remuneration and qualification requirements. The review of educational programs in the field of food safety includes the review of both Georgian and foreign educational programs along with the analysis of the accreditation process. The next part of the paper is an online survey of students and an assessment of student interest and motivation, followed by a summary of key research findings and recommendations.

The study included 29 interviews with food safety and quality specialists, educational institutions, dairy and meat companies, and consulting companies. The study answers questions such as:

- How high is the demand for food safety and quality specialists in the labor market?
- Which factors influence the demand for food safety and quality specialists in the labor market?
- What are the current qualification requirements for food safety and quality specialists in the labor market?
- What employment opportunities do food safety and quality specialists have in the private and public sectors?
- Which training programs train food safety and quality specialists in Georgia?

Introduction

Protecting the safety and quality of food is one of the most important aspects of public health, as there are many food-related diseases that cause significant harm to human health. That is why it is necessary to adhere to national and internationally recognized standards of quality and safety in the food production process in order to ensure the production of safe and quality food products and to protect public health from foodborne diseases. That is why it is essential to adhere to nationally and internationally recognized standards and requirements for quality and safety in the food production process; there were a final product inspection and quality control, providing a more structured approach to the identified hazard from the field to the table, thus replacing selective control with warning control, ultimately ensuring the competitiveness of enterprises and providing quality and harmless food to consumers. Therefore, this is an important national priority, which largely depends on the health of the population and keeps the gene pool.

In Georgia, the obligations under the Association Agreement with the European Union have had a significant impact on the development and implementation of food quality and safety regulations.

In recent years, a number of important changes have taken place in Georgia, which have served to improve the current situation in the field of food safety. These changes have led to the introduction of standards and systems such as HACCP, ISO: 22000, FSSC 22000, etc. by more and more business operators every year. These standards serve to constantly monitor and control food safety and quality.

The existence of qualified food safety and quality specialists, who are directly responsible for both the implementation of standards and monitoring its implementation in the process of food production, storage, transportation and sale, is extremely important for the implementation and effective enforcement of food safety regulations.

The purpose of this study is to assess the need for food safety and quality specialists and managers in the food production industry, to match the qualifications and skills of existing staff with the requirements of employers, and to enable the education system to train qualified specialists in this field. Information was obtained as part of the research using desk research and qualitative research methods.

The study included a survey of food companies, higher education institutions and their students, and current food safety specialists through in-depth interviews and focus groups. In addition, a student survey was conducted through structured online questionnaires to identify the factors that influence the future professions and selection of educational programs.

The findings of the study cover the following key issues:

- Factors influencing the demand for food safety specialists in the labor market and employment trends;
- Gaps between the required qualifications and skills provided by employers and their underlying causes;
- Capacities of the Georgian education system to provide training for qualified food safety and quality specialists.

The presented research, based on the assessment of the market situation and challenges, identifies the main directions and necessary actions that will help:

- Educational institutions to develop educational programs tailored to the needs of the market and provide training to qualified specialists in the field of food safety;
- Eliminate the gaps between the skills demanded and supplied in the labor market, which in turn will help food business operators to seek qualified specialists and effectively ensure that the requirements set by law for the implementation of food safety and quality.

Research Methodology

Based on the market situation and challenges assessment, the presented research identifies the main directions and necessary actions that will help to gather the necessary information in the research process using qualitative research tools, which included processing the information within the desk research and also interviewing key stakeholders with in-depth interviews and focus, through groups. For the purposes of the study, the main stakeholders were higher and vocational education institutions, organizations operating in the food industry, food safety and quality specialists, as well as students currently studying in higher education programs in the field of food technology.

In addition, an online survey of students and entrants was conducted using structured quantitative questionnaires to understand their interests, motivation, and key factors influencing their decision to choose a future profession.

The study was conducted in three main phases:

Desk research - At the initial stage, desk research processed secondary information, which included: analysis of the legal framework, review of labor market research reports and statistics, review of both international and national food safety education programs, Georgian and international employment platforms. Furthermore, an analysis of the qualification requirements defined for the position of Quality Specialist. Based on the desk research, the need for additional information for the purposes of the research was identified, stakeholders were identified, and a data collection strategy was developed as part of the field research. Based on the information received in the first stage, a desk research report was prepared;

Field Study - The field study consulted with stakeholders to obtain additional information on the supply and demand of food safety and quality specialists in the labor market, as well as key barriers to the search for qualified personnel. As part of the field research, information was obtained through in-depth interviews with stakeholders and focus groups. In addition, an online survey of entrants and students was conducted through structured questionnaires. In-depth interviews were conducted with representatives of organizations operating in the food industry, food sales and food safety consulting companies, food safety and quality management specialists operating in the country, With representatives of educational and state institutions. Surveys of students and entrants were conducted through a focus group and structured online questionnaires. The survey revealed the motivation, interests and limitations of students related to becoming a food safety specialist, as well as their attitudes and expectations towards the profession.

In total, 29 interviews were conducted with existing employers, educational institutions, state institutions, consulting companies, and food safety and quality specialists. Focus group interviews were also conducted with students, and an additional 100 students were interviewed through online questionnaires. The list of respondents with relevant information is presented in Annex 1.

Analysis of the information - The analysis of the information obtained during the study revealed the main shortcomings that hinder the training of qualified specialists in food safety and quality in the labor market and develop appropriate recommendations to eliminate the existing shortcomings. The recommendations in the document provide the main directions, the improvement of which will increase the number of qualified specialists in food safety and quality management in Georgia, facilitate the process of developing professional and higher education programs tailored to the labor market and eliminate professional skills gaps in the labor market.

Salary Overview

In the field of food safety and quality, Georgia has started to work actively in recent years, which is gradually reflected in the formation of the demand for food safety and quality specialists from the food industry. While there is still a severe shortage of staff in terms of food safety and quality, the process of gradual approximation to EU legislation and the growing export potential of food products will gradually increase the demand for qualified staff in the field of food safety.

Currently, the Ministry of Environment and Agriculture is working on the adoption of up to 100 normative acts in the field of food safety. Among the planned changes, it should be noted that by 2023, Gradually, it will be mandatory for public catering establishments and food producers to implement a food safety system in accordance with HACCP principles. The tightening of national regulations in the field of food safety combined with the introduction of effective enforcement mechanisms has led to an increase in industry demand for food safety and quality specialists.

With the tightening of legislative requirements, the development of the food industry and increasing competition is an additional factor driving the growing demand for food safety and quality specialists. In the last 5 years, the number of organizations operating in the field of food and beverage production has increased by 21%, while the number of employees has increased by 15%. Also, a growing trend is observed in terms of food exports. Between 2015 and 2020, food and beverage exports increased by 38%. ¹ Increased local production, growing export opportunities, and increased competition have led producers to shift their focus to food safety and quality, which in turn increases the demand for qualified personnel with relevant specializations.

Nowadays, In the field of food safety and quality in the labor market, there is a shortage of adequate quantity, as well as appropriate qualifications and skills, which will gradually become even more noticeable in the context of the growth of the sector and the tightening of regulations. The problem of staff shortage is especially acute in regions where financial resources do not allow existing enterprises to hire a qualified food safety and quality specialist, and it is not so easy to find staff with appropriate competencies.

¹ Note: Calculations are performed by the National Statistics Office based on information available in the Food Industry and Foreign Trade databases, cf. Link:

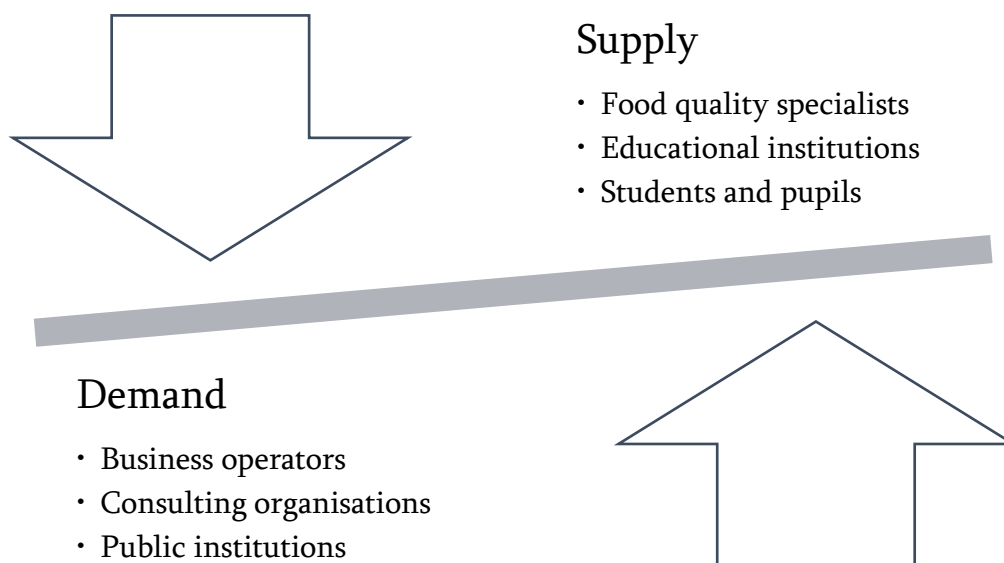
<https://www.geostat.ge/ka>

Participants of the labor market

The labor market of food safety and quality specialists in Georgia is formed by several groups, which can be conditionally divided into the following categories:

- **Employers** - which includes private and public sector organizations, including LEPL National Food Agency, Revenue Service, food production-processing-distribution chain Business operators, as well as consulting organizations and training providers, provide appropriate education and consulting services to various members of the food chain.
- **Suppliers** - which includes both on-the-go food safety and quality specialists, as well as students and educational institutions, who provide the necessary skills and qualifications for the labor market.

Graph 1. Main participants of the labor market



Public Institutions

State institutions play an important role in shaping the demand for food safety and quality specialists. In addition to introducing regulations and standards in the field of food safety and quality, they directly contribute to the growth of demand for staff in this specialty while also representing employers. The main employers of food safety and quality specialists in the public sector are the Ministry of Environment Protection and Agriculture of Georgia and its subordinate agencies, including the National Food Agency. However, it should be noted that the public sector is not a major employer, as the number of staff is limited according to a pre-defined staff schedule.

Business operators²

The largest share of demand for food safety and quality specialists is formed in the private sector. Employers' role is business operators operating in the Georgian market, whose activities are related to food - be it raw material production, raw material processing, production of products, or distribution / sale-related activities.

² Operator - a person whose activity is related to the production, primary production, processing, distribution, as well as veterinary and plant protection services in the field of food / animal feed, animal, plant, animal and plant products, veterinary medicine, pesticide, agrochemical, and who is responsible for his / her activities. For compliance with specified requirements;

According to the respondents' information, today, more than 45 thousand food business operators are registered in the market. The number of staff in the field of food safety is not statistically recorded, although based on the respondents, it can be assumed that the number of staff in the field of food safety does not exceed 5,000 people, which means that there are nine jobs on average per specialist. Due to the lack of adequate and qualified staff, the private sector often has to hire unskilled staff and further train them or train existing staff in the field of food safety.

Consulting organisations

Consulting organizations represent both employers and service providers, assisting business operators in the process of implementing food safety and quality management standards, as well as training staff directly involved in food safety and quality management follow-up and follow-up.

Consulting companies are currently actively represented in the Georgian market. In some cases, they are the service providers of international organizations such as Loyd, BRC and IFC. Accordingly, the certificates issued by them are recognized by the organizations mentioned above and, consequently, in the international market. As for the services offered by Georgian consulting companies, they offer customers the introduction of such standards as HACCP, ISO 22000, FSSC 22000, BRC, FAMI-QS, GLOBALG.AP, IFC and others.

Food safety specialists

At present, within the framework of higher education programs in Georgia, there is no qualification in the field of food safety and quality. Teaching food safety subjects is mainly done within different programs. Due to these circumstances, food safety and quality specialists operating in the market have received higher education in adjacent specialties of food safety and gain field knowledge through additional training, short-term professional training courses and practical knowledge gained in the workplace. Most of the food safety and quality specialists surveyed in the study have higher education in specialties such as applied biosciences, food technology, biology, chemistry, hygiene, pediatrics and public health. The respondents also mentioned the significant impact of training courses and qualification programs taken outside of Georgia in the process of establishing them as food safety and quality specialists.

Higher and vocational education institutions

There are no bachelor's, master's and / or doctoral programs in food safety and quality specialists in Georgia, although specific programs cover food safety subjects. Currently, undergraduate and graduate programs related to food technology and the food industry are implemented in six higher education institutions: Georgian Technical University, Georgian Agrarian University, Akaki Tsereteli State University, Batumi Shota Rustaveli State University, Iakob Gogebashvili. Telavi State University, Ilia State University. In addition, undergraduate and graduate programs in Applied Biosciences and Biotechnology of Ivane Javakhishvili State University (TSU), And undergraduate and graduate programs in public health at the Georgian Medical University are taught in disciplines that are directly related to food safety (e.g., microbiology, biochemistry, food hygiene, Etc.). However, the existing curricula do not provide graduates with a qualification in the specialty of food safety and quality.

Students

This category includes students studying in programs related to food safety, such as public health, food technology, bio-sciences, etc. As the research showed, this direction is not very popular among students, which is evidenced by the statistics of the faculties selected by the entrants for the Unified National Examinations. The analysis of the data of the Unified National Examinations Center revealed that the number of applicants for the faculties named "Food Technologies" and "Food Technologies" has been reduced by 33%. However, it should be noted that in terms of priorities, the number of entrants who were ranked in the first place in the faculties

related to the food and food industry has increased by 7%, which gives us reason to think: That the share of those entrants who consciously choose a profession in the field of food and food industry is gradually increasing.

The main function and responsibilities of food safety and quality specialists

The responsibilities and duties of food safety and quality specialists depend on the employer organization and its position, therefore, are not standard. As practice shows, food safety specialists in the private sector may be employed by: Food Safety Specialist, Food Safety and Quality Specialist, Hygienist, Head of Food Testing Laboratory, Head of Quality Service and Head of HACCP Group.

Regardless of the position, we can highlight some of the key responsibilities of those employed in the position of food safety and quality specialist in the private sector:

Ensuring compliance of business activities with the existing legislation and standards in the field of food safety and quality. Including having constantly updated information on industry regulations and adapting business processes to them.

Participate in the introduction and enforcement of food safety and quality standards. - Production or monitoring of documents related to food safety and quality.

- Monitoring of all employees at the workplace and control over their observance of sanitary-hygienic norms both in personal hygiene and in the production process.
- Receiving and control of incoming raw materials and subsequently checking the safety and quality indicators of the finished products.
- Organize and control hygiene procedures, including washing / disinfection.
- Control of storage and transportation of products.
- Inspection of facilities and audit of raw material / product suppliers.
- Analyze the results of laboratory tests and make appropriate decisions, including requesting a running party if there is a reasonable suspicion that the party will endanger the health of consumers and / or the image of the company.
- Checking and controlling the conditions of placing the products for sale in different sales facilities. Naturally, it is difficult to constantly monitor the conditions in all sales facilities, however, the specialist should give instructions on the conditions required for the storage of their products. However, it is desirable if you visit this or that test facility with a specific frequency and check the actual conditions.
- Specialists are also often required to train new (and possibly existing) staff and / or mentor them in the workplace.
- Development and control of self-control mechanisms. - The responsibilities of specialists in managerial positions also include controlling the activities of the laboratory in the organization and conducting internal audits at specific intervals or unscheduled inspections, based on their own decisions;

As for the public sector, the main employers of food safety and quality control specialists are the legal entity of public law under the Ministry of Environment and Agriculture of Georgia, the National Food Agency (NES). Specialists in SES are employed in the Food Safety Department for both inspector and managerial positions, whose main functions are:

- Establishing a quality management system in accordance with international standards in the field of food safety, develop a plan for its implementation;
- Development and implementation of the annual program of state control of food safety;
- Issuance of hygiene and veterinary certificate within the scope of competence and control over the issuance;

- Determining the compliance of the food business operator's hazards with internal control and traceability systems;
- Implement risk management and communication based on risk assessment in the field of food safety in accordance with the legislation;
- Initiate and develop action guides and methodological documents in the field of food safety;
- Exercising other rights and responsibilities imposed by law.

Recruitment process and remuneration

The recruitment process and remuneration vary according to the size and activities of the organizations. Recruitment in the public sector is carried out through competition, in accordance with the procedures established by law. The vacancy is announced on the Civil Service Employment Platform (hr.gov.ge), from where the received applications are selected through a competition. The recruitment process is entirely different in the case of private organizations. The study found that personal contacts and credible referrals in this area play a more critical role in the job search process. Private organizations find the necessary staff based on personal contacts' recommendations and rarely apply to employment platforms or educational institutions. This may be because the vacancies for the position of food safety and quality specialists are rarely advertised on current employment platforms.

Large and medium-sized organizations use a relative variety of methods in finding qualified personnel. In the process of finding the required staff, they use both personal contacts and recommendations, as well as post job vacancies on employment platforms.

Employment of students and graduates is promoted through memoranda of understanding between universities and the private sector and open house days. However, according to the respondents, these mechanisms are not sufficient and can not facilitate the student employment process. One of the reasons for the memoranda's ineffectiveness was the indifferent attitude of entrepreneurs towards internship practices. According to respondents, entrepreneurs are rarely interested in hiring current students or graduates for internships. Often, students take the initiative to contact an employer and negotiate an internship. However, these negotiations are mostly unsuccessful. According to the respondents, on average, up to 5-10% of the organizations agree to hire a student for an internship.

Salary

Remuneration for food safety and quality specialists varies between the private and public sectors. Although the lower salary threshold in both private and public structures is almost in the same range and amounts to 500-600 GEL, in contrast to the public sector, with experience and qualifications in the private sector, specialists have a much higher salary prospect increases. Remuneration of staff employed in specialist and senior specialists in the public sector ranges from 1000 to 1400 GEL. As for the private sector, a specialist's remuneration directly depends on his qualifications and professional skills. The remuneration of an experienced specialist in the private sector is 2500-3000 GEL, but in some cases, for an experienced staff who will be able to fully manage food safety and quality, the private sector is willing to provide higher salaries.

Qualification requirements for the position of Food Safety and Quality Specialist

Food safety and quality specialist qualification requirements vary in the international and local markets. The analysis of international employment platforms revealed that the qualification requirements for the position of Food Safety and Quality Specialist are much stricter than in the case of Georgia.

The table below compares the qualification requirements published on Georgian and international platforms.

Chart 1. Qualification requirements for food safety and quality specialists defined on local and international employment platforms

Criteria	International Platform	Georgian employment platform
Education	<ul style="list-style-type: none"> - Bachelor's degree in food safety, microbiology, chemistry, food science or other sciences; - Priority will be given to a master's degree in the following areas: public health, epidemiology, food safety, infectious diseases, environmental toxicology or health risk assessment. 	
Knowledge and experience	<ul style="list-style-type: none"> - Understand HACCP principles, food safety plans and QMS functions; - Several years of progressive experience in the field of food safety, including a managerial position in an organization with HACCP, ISO, etc. 	<ul style="list-style-type: none"> - Bachelor's degree (or be a graduate student) in Bio-Sciences, Health, Nutrition or other related sciences; - Experience in food safety or related areas;
Courses and trainings for higher qualification	<ul style="list-style-type: none"> - HACCP Standards Course Certificate from a nationally / internationally recognized and accredited body; 	<ul style="list-style-type: none"> - It will be considered an advantage if the staff has been trained in HACCP or ISO 22000;
Personal skills		<ul style="list-style-type: none"> - The staff should have the desire and motivation for self-development.

As can be seen from the given list, the employer's demands in the international market towards food specialists are relatively high, though justified. The Georgian labor market requirements are quite different from the international requirements, as Georgia is taking the first steps towards food safety; therefore, it is difficult and often even impossible to find a staff that will meet the above requirements.

Despite the simplicity of these requirements, the number of professional staff in Georgia is small, which is due to the fact that despite having a diploma, graduates do not have the necessary theoretical and practical knowledge that an employer needs. Besides, the interest of students in the field of food safety and quality is low. This approach is mostly right for companies that are members of an international organization or group. Simultaneously, both employers and specialists try to find exciting training or lectures that will be useful for their professional development. It should be noted that these companies mainly fund employees' training or have their own in-house training program. Such companies generally require good English language skills from the staff; such companies generally require a good knowledge of English in addition to staff, as food safety and quality specialists will have to communicate frequently with foreigners.

The situation is entirely different in the case of small business operators. Small companies do not have sufficient financial resources to provide additional staff in the field of food safety. Such organizations typically turn to consulting firms or external experts to ensure the implementation of food safety and quality management standards (mainly in the case of HACCP), with the subsequent business owner or manager taking responsibility for monitoring standard compliance. In the process of operating the standards, there is constant

remote communication with the implementing consulting company and receiving professional advice from them.

Due to the scarcity of financial resources, raising the qualification of employees in small enterprises and retraining of staff is carried out through trainings offered by various organizations, which are mostly free and donor-funded. However, if necessary, the employer also finances certain types of training and retraining courses.

Educational Programs in the Field of Food Safety

As already mentioned, undergraduate and graduate programs in the fields of food technology, food technology and food industry are implemented by 6 higher education institutions in Georgia, namely:

- Georgian Technical University
- Georgian Agrarian University
- Akaki Tsereteli State University
- Batumi Shota Rustaveli State University
- Iakob Gogebashvili. Telavi State University
- Ilia State University

Food safety as a study discipline is presented in the programs of the above mentioned universities, the subject credit volume is 3 and in the case of some programs - 5 and 6 credits.

Food safety and food technology disciplines (eg food hygiene, microbiology, basics of biochemistry) are taught in Tbilisi State Medical University, undergraduate program in public health, and in the master's program in public health - food safety course. Iv. Javakhishvili Tbilisi State University, Bachelor's and Master's programs in Applied Biosciences and Biotechnology include disciplines such as biochemistry, biology, microbiology, food biotechnology, food production technology, microbial technology, food and nutrition, and food quality. Production of products and enzyme technology, etc.

Also, Samtskhe-Javakheti State University has integrated Master Program in veterinary medicine, which also include subjects related to the monitoring of food safety and food hygiene. In total, the module takes 16 credit in the program and includes the following subjects: Food Production Hygiene, inspection of meat and meat products, production technologies, quality and safety of milk, dairy and meat products. Also, program includes practical trainings in the field of food safety and veterinary supervision, which is granted for 5 credits. After completion of the program the students receive MA qualification in veterinary.

The table below lists the higher education programs of the educational institutions listed above and the qualifications to be awarded to the graduates within the program.

Chart 2. List of higher education programs and qualifications to be awarded

	University	Programs	Awarded qualification
1	Georgian Technical University	Food technology	Bachelor of Food Technology
2	Georgian Agrarian University	Food technology	Bachelor of Food Technology Master of Food Technology
3	Akaki Tsereteli State University	Technology and expertise of agro-raw food products	Bachelor of Food Technology
4	Akaki Tsereteli State University	Food technology	Masters in Food Technology
5	Akaki Tsereteli State University	Food technology and safety	Bachelor of Food Technology

6	Ilia State University	Food product science	Masters in Food products science
7	Batumi Shota Rustaveli State University	Food technology	Bachelor of Food Technology
8	Iakob Gogebashvili. Telavi State University	Food technology	Bachelor of Food Technology

Prerequisite for admission to undergraduate programs in food technology is a document certifying general education and passing 3 compulsory subjects (Georgian language and literature, foreign language, mathematics or history) on the national exam.

Also noteworthy is the state support for food safety programs, which is reflected in their full funding. In the 2020/2021 academic year, the following accredited undergraduate / graduate programs received full state funding:

Chart 3. Program direction/ directions in which/ in which the student's tuition fee is fully funded by the state

	University	Program
1	Georgian Technical University	Food Technology
2	Akaki Tsereteli State University	Food technology and safety
3	Iakob Gogebashvili. Telavi State University	Food technology

It is noteworthy that since 2020 there has been a change in the national exams, in particular the change in the number of exam subjects, the list of elective and compulsory exams. It became mandatory to pass 3 subjects (Georgian language and literature, foreign language, mathematics or history), and the fourth elective subject was given to universities.

In 2020, entrants passed three compulsory subjects (Georgian language and literature, foreign language, mathematics or history) to continue their studies in food technology, agro-food technology and expertise, food technology and safety undergraduate programs, and subjects such as chemistry, biology and Etc. Universities were not included in the list of compulsory subjects. Consequently, the student has to master the basic subjects necessary for the specialty in the first and second year of the academic year before studying the modules and subjects of the specialty, which increases the probability that due to the complexity of the studies, the student stops studying in this direction and enjoys mobility. Will be sufficient for employment in the specialty. As a result of the analysis of similar programs of foreign universities, in order to continue their studies in similar programs, the entrant's knowledge is tested with the relevant exam in the basic subjects necessary for the specialty, such as biology, chemistry, mathematics, Etc. Based on the choice of a specific subject or subjects for examination by the University.

Master's Programs

The analysis of the master's programs implemented in Georgia shows that only two higher education institutions, Akaki Tsereteli State University and Ilia State University, implement the master's program in food technology. Prerequisite for admission to the Master of Food Technology program is a bachelor's degree or equivalent, passing a general master's exam and a university-defined exam / exams.

Iliia State University Master's Degree Program in Food Science more or less presents the basic subjects necessary for the study of food safety and technology, such as food chemistry and biochemistry, food microbiology and microbiological safety, food toxicology, food biology, food biology, Chemical and microbiological analysis of food, food additives, etc. The aim of the Master's program in Food Science is to prepare a specialist in the field of food science, who will have systematic knowledge of the chemical composition of food products, modern technologies of laboratory analysis, biochemical and microbiological safety of products. Will be able to determine the efficiency of product processing, quality control and safety processes in the enterprise and to study modern complex problems in the field of food science using the latest research methods. The study disciplines of the program are 6 credits, as well as the 6-credit internship. Students use scientific research laboratories (chemical, laboratories of the Institute of Biology, research laboratories for genetically modified products). Laboratory work is mandatory for only a few subjects. There is also a 6-credit internship. Students use scientific research laboratories (chemical, laboratories of the Institute of Biology, research laboratories for genetically modified products). Laboratory work is mandatory for only a few subjects. There is also a 6-credit internship. Students use scientific research laboratories (chemical, laboratories of the Institute of Biology, research laboratories for genetically modified products). Laboratory work is mandatory for only a few subjects.

Also, Agrarian University has MA degree programs in food technology. The program consists of the following subjects: (1) general modules (research, legal, ethical and commercial principles of biosciences, the protection of intellectual rights, foreign language and teaching methods) which take 26 credit; (2) Subjects related to the specialization (Laboratory methods for technical and chemical control of food products, microbiological methods for controlling food quality, biosafety principles and etc.) have 45 credits in the program (3) practical component takes 8 credits and the rest is distributed on preparation of Master Thesis (35 credits) and elective subjects.

Compared to similar foreign programs in the Master of Food Technology program, it is clear that those wishing to study in foreign programs in the field of food technology and food safety must have a bachelor's degree in natural sciences or life sciences, which is not the case in Georgia. Consequently, today any entrant who has a bachelor's academic degree can continue their studies in any master's program, including in the field of food technology and food safety. Due to the fact that students enrolled in the master's program may not have knowledge in the field of specialties, a large part of the course defined by the university master's programs is devoted to general specialties to provide the student with basic knowledge to overcome the subjects and specialization subjects. As a result of this practice, the number of core courses required for the specialty and specialization within the master's program decreases and the knowledge gained is therefore not perfect for continuing to study for a doctoral program, especially for foreign programs abroad and for employment.

Professional education programs

Currently, vocational education programs are implemented by 17 higher education institutions. The analysis of the educational catalogs of HEIs revealed two higher education institutions that implement the following vocational education programs:

1. **Georgian Technical University** - Level III Subject Vocational Education Program Food Ecology Control Specialist (30 credits) The aim of the program is to train Level 3 Food Control Specialists who are able to: Calibration and accuracy selection of atomic-absorption spectrometer, determination of heavy metals in food by atomic-absorption method. Qualification to be awarded: Professional qualification of the third level of ecological control specialist of food products.
2. **Gori State University** - Vocational education program in dairy production (85 credits). The aim of the program is to provide the labor market with a competitive staff for the field of production and processing, in particular, for the production of food products. Qualification to be awarded: Secondary

professional qualification in the production of food products. The holder of a secondary professional qualification in the production of food products can be employed in any private or state-owned enterprise producing dairy products (including enterprises owned by the JSC "Partnership Fund" and share-owned enterprises). The University operates a dairy processing plant where professional program students undergo production internships and students have the opportunity to be employed in the enterprise.

The modules and subjects of the presented educational programs integrate the issues of food safety, which does not provide the opportunity for systematic and quality education in this field, is aimed at acquiring theoretical knowledge and does not include practical (including laboratory) work.

Training and short term courses

In addition to academic and professional programs, several training centers offer short-term food safety courses.

- Online Food Safety Management course (duration - 6 hours) is conducted by Caucasus University Training Center. The Certified Course in Food Safety and Quality Management Systems is designed for company managers involved in agriculture, primary production, food processing, storage or distribution, as well as catering. The course discusses the requirements of local legislation, international experience and standards (GHP & GMP, HACCP, ISO 22000, ISO 9001). After completing the training, the manager will be able to ensure the production of harmless and reliable products by the company. Detailed questions to be covered during the course: Sample Hygiene Practice GHP - Enterprise Infrastructure and Other Requirements and Production Sample Practice GMP, Required Records and Procedures, Traceability; Threats of food safety (microbiological, chemical, physical); System of Hazard Analysis and Critical Control Points HACCP; Sector-appropriate HACCP (HoReCa, cheese, meat, nuts, cookies); State system, national legislation, international standards ISO 22000.
- Training course on food safety and inspection control (duration: 87 hours) is carried out at Tbilisi Iv. Javakhsishvili Tbilisi State University Training Center. The aim of the course is to prepare food safety specialists who will be able to assess the key factors and principles ensuring food safety and to carry out inspection controls at different stages of food circulation. Issues to be studied during the course: Georgian legislation on food safety regulation, comparative analysis of international and Georgian legislation, local, regional and international food safety organizations and their authorities, modern food safety management systems (GMP, GHP, HACCP, GLOBAL, Etc.), risk analysis, Inspection control and general rules of conduct and competencies of authorized persons, rules and procedures for inspection of food safety, types of food business operators, requirements for the territory of food processing enterprises, requirements for waste collection-export of meat, meat and meat products Seafood, nutritional value, chemical composition, priority contaminants, production and processing characteristics, canned food, alcoholic and non-alcoholic beverages, nutritional value, chemical composition, primary contaminants, production and processing characteristics, non-alcoholic beverages. Baby food products, drinking water and requirements for it, production of animal feed and requirements for it, etc.
- Training course on food safety and hygiene, HACCP, GMP, GHP (duration - 10 hours). The course is conducted by the Food Safety Consulting Center. The course covers the following topics: Introduction, Food Safety, The Importance of Food; Food safety hazards; Workplace and equipment design and features; Methods, terms and conditions of processing, storage of raw materials and finished products; Temperature control modes; Cleaning, disinfection, pest control, waste management; Food safety legislation; Food labeling rules; GMP (sample production practice); GHP (Hygiene Model

Practice); HACCP (Hazard Analysis and Critical Control Point Management System); Accounting logs; Personal hygiene of staff.

Certificate programs are focused on theoretical teaching. Only the training center of Tbilisi State University provides 15 hours of the internship; the course does not include internships and laboratory work but also involves internships in state and private structures or enterprises initiate inspections and draw up a compliance act. The problem of practical knowledge was also highlighted in a focus group interview with students. Students unanimously noted that those lecturers who currently teach these programs at the university do not have the practical experience that sharing with students can be effective. Accordingly, the training of lecturers and trainers in this area is also on the agenda.

Training Center ISO Consulting implements a training program for food safety management systems. During the course, the trainee will study the identification and control of food safety hazards, food safety system verification and audit methods, hygiene rules (GMP / GHP), study the HACCP system, principles, and application various food safety systems. BRC et al. The program begins with the Basic Level of Food Safety (GMP / GHP) and ends with IRCA-led Lead Auditor Training. All food safety training is developed in the UK and is conducted by Lloyd's experienced and iTOL-trained trainers.

Experience in implementing food safety and quality programs by foreign universities

Important components in the development and implementation of master's programs in food safety and quality at foreign universities are the existence of university laboratories on a university basis, where students can carry out research projects and laboratory activities, practical training in the enterprise (51% of the study program) and master's degree.

It should be noted that the academic staff implementing the master's programs are employed in the enterprise, have not only theoretical knowledge but also many years of practical experience, and they themselves supervise the students during the preparation of the thesis and the performance of the practical component.

It should be noted that in some universities, undergraduate programs, students have the opportunity to complete a three-month internship with the help of the university. Develop leadership and problem-solving skills, communication skills, and work ethic and discipline, which are important in the graduate integration of graduate graduates into the employment market.

German Bayreuth University - Implements the Master's program in Food Quality and Safety as an interdisciplinary program and in addition to the compulsory subjects for the specialty, the program presents subjects from the fields of natural sciences, law and economics, which gives the master complex knowledge not only in natural sciences, but also in law and economics.

Local and international food industry companies, enterprises, research centers, government agencies are actively involved in the development and further development of the program, which contributes to the timely introduction of innovations in the field of food safety in the master program and the renewal and improvement of the program.

The duration of the university master's program is 2 years (120 credits). The training modules include a theoretical component - 50% and a practical component - 50%, which emphasizes the importance of the practical component in the program. The practical component includes a 3-month internship at the enterprise, where the student is given practical assignments, the performance of which is supervised by a mentor at the enterprise. However, some of the subjects include practical laboratory work. An important component of the program is laboratory research (based on laboratory research) and its use.

Prerequisite for enrollment in the program is a bachelor's degree in biology or biochemistry or a bachelor's degree in natural sciences. Applicant must have some knowledge in Mathematics and Data Analysis,

Experimental Physics, Chemistry, Animal and Plant Physiology, Genetics, Microbiology, Ecology, Biochemistry, Bioinformatics and Natural Sciences. Work experience is not a prerequisite for the program. Another prerequisite for enrollment in the graduate program is an above-average GPA (weighted average score).

Upon completion of the master's program, the graduate is awarded the qualification of Master of Science. The graduate can pursue a career in both research and employment in the food industry, government agencies, business and the media.

It should be noted that the modules of the program include training disciplines in innovation, technology and data processing, including innovations in biochemical analytics, modern sensory technology and data processing, which helps students to introduce new technological and innovative approaches in training laboratories and enterprises and creates new opportunities. For both universities and enterprises. In addition to the above subjects, the program teaches subjects such as food microbiology, food metabolism and toxicology, agricultural plant and farm animal biology, food physiology and immunology, chemical food analysis, data analysis and statistics, introduction to law and food law, food and Food Authenticity Law, Commercial Law Food Safety and Risk Management Law, Food Quality Management, Food Supply Chain Management. The curriculum of the program includes multidisciplinary trainings such as case studies and scientific communication.

Debreen University in Hungary It is the third largest university in the country pursuing a Master's program in Food Safety and Quality Engineering at the Faculty of Agriculture and Food Sciences and Environmental Management. The duration of the program is 2 years (120 credits). Prerequisite for the program is a bachelor's degree in food engineering, chemical engineering, biological sciences, agronomy. Qualifications Awarded: Food Safety and Quality Engineer. Prerequisite is above average GPA (weighted average score) 3.0 and above.

An important component of the program is the research component in the preparation of the master thesis. A personal academic tutor assists the student in achieving learning outcomes and in pursuing individual goals and interests. The training modules of the program are:

Organic and Inorganic Biochemistry, Food Safety and Quality, Food Processing Technology, Economics, Chemical and Microbiological Analysis, Food Production Regulation, Quality and Safety, Quality Management Systems and Audit in Food Industry, Food Industry Management and Economics, Analytical and Microbiological Methods, Quality Management, Quality and Safety in Food Technology (HACCP Practice), Laboratory Practice, Master Thesis, etc. The teaching disciplines that require laboratory work are carried out on a university basis.

The teaching components in the master's program are distributed as follows: 49% - lecture, seminar, and 51% - internship. It should be noted that the practical component of the training program is 4 weeks, which is a total of 160 hours, while most of the training disciplines presented in the training modules involve laboratory work.

The teaching process takes the form of ongoing lectures, e-learning tutorials, seminars, practical sessions, as well as significant attention to research project preparation and self-study.

The research component is conducted in university laboratories or research institutes. And the internship is possible in both local and foreign enterprises. The internship supervisors in the enterprise supervise the student's performance of practical assignments and their daily production activities. In order to bring the theoretical component closer to the practical component, the faculty administration and academic staff actively collaborate with enterprises, presenting pre-programs and writing practical assignments for the student. After completing the internship, the student submits a 10-page report detailing the student's activities in the production process, describing daily activities and technological processes, including work organization, management, Administration and other processes. Upon completion of the internship, the enterprise issues a certificate.

Kauna's Technology University In lithuania Implements a master's program in food science and safety. The duration of the program is 2 years (120 credits). The program trains broad-based specialists in the food science who can be employed both in the food industry and in companies that conduct food research and create new products. The aim of the master's program is to provide in-depth and systematic knowledge of specialization and to develop managerial / interdisciplinary skills by offering relevant training courses. Prerequisite for enrollment in the program is a bachelor's degree in chemical engineering with a grade point average above GPA (GPA 3.0 or higher).

Learning disciplines help students develop and deepen interdisciplinary skills, develop managerial skills or other competencies to gain a competitive advantage in a career. The advantage of the program is that the student develops competence in three main areas, namely scientific research, introduction of technologies and innovations, food safety and quality. The Modern Center for Food Science and Technology Competence in Lithuania facilitates student research and development of competencies in the field of food technology (including bread, beer, meat, fish, dairy products).

Upon completion of the study, the graduate can work in both sectoral and interdisciplinary directions. Within the master's program, the student will study the following compulsory disciplines: Food Biotechnology, Food Quality and Safety Management, Food Safety and Toxicology, Food Chemistry, Food Safety Law. Electives include: Cereals & Confectionery - Science & Technology, Dairy Science & Technology, Fat Content & Processing, Fermentation Science & Technology, Fish Food Science & Technology, Meat Science & Technology, Molecular Nutrition Technology, Fruit & Vegetable Science, Special food technologies, sugar and starch products Science and technology and a practical creation of new food products.

Upon completion of the study, the graduate can work in both sectoral and interdisciplinary directions. Since the student gains hands-on experience in laboratories and enterprise internships over two years of study, it is easy to integrate students into the employment market. It is noteworthy that student ambassadors and advisors from the faculties are actively involved in the promotion of the program, assisting the entrant in obtaining information about the desired specialty and employment. Another advantage of the program is working on a research project on which the student works for two years with a tutor in an enterprise.

Prestigious American University, Cornell University The College of Agriculture and Life Sciences implements the Master's program in Food Science and Technology with the following concentrations: General Nutrition Science, Food Chemistry, Food Microbiology, Food Engineering, Dairy Science, Food Waste Technology, International Food Science, Sensory Assessment, Oenology. The master's program at Cornell University is 2 years, the student works together with one senior and one junior advisor in a selected field on a research project and laboratory work.

For the master's program, the student chose a major and an additional major. Before completing the program, the student must make at least one research presentation and assist the professor for one semester. Before the beginning of each semester, the student has to pass the qualification exams. Each semester the student has hands-on workshops. The main concentrations of the program are: Dairy Science, Oenology, Food Chemistry, Food Engineering, Food Microbiology, Food Processing Waste Technology, Food Science (general), Sensory Assessment and more.

The master's program allows the student to develop knowledge and skills and deepen in fundamental and applied research. It should be noted that those who want to study at the University program, who do not have a bachelor's degree in nutrition science and want to continue their studies in this field, can prepare for the one-year vocational training program (MPS) and prepare a 15-credit thesis before enrolling in the master's program. Calculus, Chemistry, Organic Chemistry, Physics, Microbiology. All courses include both theoretical training and laboratory work on specific tasks.

The professional program is designed for people who are already employed in the food industry but want to develop their knowledge, as well as for those who have a qualification in non-food science and want to pursue a career in food science to gain the necessary knowledge and practical experience.

The one-year vocational training program consists of two main components:

- Training course: Students, together with the faculty advisor, establish an individual training course with concentrations of the subjects they wish to take.
- Capstone Project: Under the guidance of a faculty advisor, students work on real problem solving in laboratories and research centers.
- Specialization courses / modules are: Food Science, Food Chemistry / Product Creation, Food Microbiology / Food Safety, Food Engineering, Milk Processing, Sensory Assessment, Oenology.

Each specialization courses / modules develop the skills required for the specialty, provide theoretical knowledge and develop practical problem-solving skills needed to start a professional career in the field of food science. After completing the professional course, the student can be employed in the following positions: Food Scientist, R&D (Research & Development) Specialist, Food and Flavor Technologist, Product Development Specialist, Oenologist, Winemaker Assistant.

Comparison of Georgian and foreign curricula

Comparing the curricula of Georgian and foreign similar programs, the following was revealed:

- A large part of foreign curricula is devoted to internships, while the share of internships in similar Georgian curricula is quite low - the practical component for undergraduate and graduate programs in food technology is 5, 8 or 15 credits, while students in similar foreign programs have 3 months of internship or internship. , With a total of 30 credits.
- The share of laboratory work component in foreign educational programs is much higher than theoretical training, which contributes to the acquisition of practical knowledge and rapid adaptation of graduates to the labor market. By working on cases, the student builds on theoretical knowledge through practical assignments in the case of a specific subject, which ultimately facilitates the student's rapid integration into the employment market.
- In foreign educational programs, unlike Georgian analogues, the master's thesis is based on practical experience. An analysis of similar foreign programs revealed that while preparing a master's thesis (30 credits), the student actively works on solving a specific case in the enterprise and develops a specific topic in the enterprise together with the tutor. The master thesis is based not only on the theoretical part, but also on the practical solution of one specific issue.

It should be noted that the theoretical and practical components of similar foreign programs have almost equal distribution, which once again emphasizes the importance of the practical component along with theoretical teaching, which increases the interest of entrants and students in foreign programs and the attractiveness of the programs.

Accreditation of educational programs

The purpose of program accreditation is to determine the compliance of the educational program with the accreditation standards of the educational institution, which ensures the establishment of systematic self-assessment of quality improvement and the promotion of quality assurance mechanisms. A state training grant is issued on the basis of accreditation. The university has the right to implement an educational program within the authorization without passing the program accreditation, however, in this case no state study grant is issued and the students enrolled in the program will not receive state funding.

The program accreditation process includes a trip of a group of experts to the educational institution by the National Center for Quality Development and evaluation of the program by the following criteria: program content, provision of teaching resources, teaching methodology and organization, adequacy of program evaluation, teaching development opportunities, student services, student services, working. The compliance of the educational program with the accreditation standards is assessed according to a 4-level scale:

- Complies with requirements;
- largely complies with the requirements;
- Partially complies with the requirements of the standard;
- Does not comply with the requirements of the standard.

To obtain accreditation for an educational program, an educational institution must submit an accreditation application to the National Center for Quality Development (application review fee is 200 GEL), pay the accreditation fee (8356 GEL without business trips, in case of business trips - 11433 GEL). Expenses include expenses related to administrative proceedings (salary, office and board meeting expenses), expenses for accreditation and business trip of accreditation experts, expenses related to checking the fulfillment of the conditions of accreditation of the educational program during accreditation. And pension contribution (Order №14 / n of the Minister of Education and Science of Georgia of January 29, 2020 on the Approval of the Accreditation Regulations and Fees for Educational Programs of Educational Institutions).

After submitting the accreditation application and paying the fee, a group of accreditation experts is formed by the order of the director of the center, which checks compliance with the accreditation standards of the educational program, holds meetings with the administrative and academic staff, employers and potential employers, students and graduates. After reviewing the documentation of the educational institution and visiting the institution, the group of experts will develop a conclusion, which will be submitted to the National Center for Quality Development.

The decision on accreditation is made within 180 calendar days after the submission of the accreditation fee. The decision regarding the accreditation of the educational program is made by the Accreditation Board consisting of 16 independent members. The decision on accreditation can be of 4 types: on accreditation; On conditional accreditation; Refusal of accreditation; On revocation of accreditation. The term of accreditation of the program is 4 years, the term of validity of re-accreditation is 7 years, and the term of conditional accreditation is not more than 2 years. The decision on conditional accreditation is not made twice in a row. It should be noted that although the requirements for the updated Accreditation Standards approved in 2018 have increased significantly, the decision made as a result of the program evaluation is not rigid and in case of program accreditation refusal, the educational institution can appeal the decision to the Board of Appeals.

Updated standards for accreditation of higher education programs

The updated standards for the accreditation of higher education programs were approved in 2018 and it is in line with the European Higher Education Quality Assurance Standards and Guidelines (ESG 2015). The introduction of standards allows for in-depth and detailed evaluation of program outcomes and development, which helps to improve the quality of educational programs. The structure of accreditation standards was changed and the description of each component of the standard, evaluation criteria and indicators were written in detail.

An important difference between the old and new standards is that the new standards measure the final results of the program and the student's learning, compatibility with the requirements of the employment market of the program and, consequently, the involvement of employers in the design and development of the program. As well as for mutually beneficial cooperation in the long run and also reduces inconsistencies between education and employment.

In 2018-2020, 3 bachelor's programs in food technology (Georgian Technical University, Georgian Agrarian University, Telavi State University), 1 master's program (Georgian Technical University) and 1 doctoral program (Georgian Technical University) were evaluated according to the new standards of educational programs. And 1 master's program "Food Technology and Safety" (LEPL Akaki Tsereteli State University) was denied accreditation. The main reasons for refusal of accreditation are: content deficiencies of the program and syllabi, consistency of disciplines, level and quality of laboratory training, the need to strengthen both quantitative and qualitative training of industrial practice, the quality of scientific work of academic staff, weak links with employers.

It is noteworthy that the evaluation of educational programs according to the new standards will help improve the quality of teaching, provide continuous development of educational programs by universities, which means attracting more qualified academic staff or retraining existing ones, strengthening the necessary infrastructure for programs, developing The purpose will also enable students to receive services that will help them develop their personal skills and gain professional experience, which will ultimately increase their integration into the employment market and opportunities to continue their studies abroad.

Students' Motivation and Interest in Existing Food Safety Programs

According to the National Examinations Center, the number of entrants registered for the Unified National Examinations in 2018-2020 ranged from 39-40 thousand on average. In 2020, 12% of the entrants registered for the Unified National Examinations indicated in their choice the faculties whose names include "Food Technology", "Food Technology", which is significantly behind the similar data of 2018. However, it is noteworthy that the number of entrants who indicated the first priority of the faculties with this name has increased by 7% compared to 2018. These data give us grounds to conclude that although the total interest of entrants in the specialties related to the food industry has decreased, the number of entrants has increased.

According to the data of 2020, the Faculty of Food Technology of the Georgian Technical University took the first place among the faculties and universities selected as the first priority in the field of food technologies and applied biosciences. Entrant) and Akaki Tsereteli State University, Department of Food Technology and Safety (74 entrants).

The survey of students and entrants revealed that the existence of career development and employment opportunities in the field plays an important role for them when choosing a profession. 49% of the surveyed entrants and students named career development and employment opportunities as the main decisive factors in the process of choosing a profession, while 19% of the respondents prefer the prestige of the university and the profession when choosing a profession.

Although 56% of the students surveyed say they are interested in food safety and quality specialties, only 21% of them are currently students of programs approaching this field. The rest of the respondents study at other faculties because they think that the employment and career growth opportunities in this field are low.

The lack of a practical component, which makes it difficult to obtain practical knowledge, was named as a major weakness of the food technology and safety programs conducted by the surveyed students. In addition, the surveyed students mentioned that there is no significant difference between master's and bachelor's programs. According to them, the main part of the master's programs literally repeats the subjects passed within the bachelor's program. Because of this, they are less interested in enrolling in a master's program, and if they continue their studies, they prefer to continue in the same direction at another university.

According to the majority of the surveyed students, in order to increase the interest in the areas of food safety, it is important for the universities to carry out more information campaigns so that young people can receive comprehensive information about the curricula. In addition, it is important for universities and enterprises to work closely together in the program development and upgrading process to balance the theoretical and practical components and to reflect labor market demands in a timely manner, which will ultimately help graduates enter the employment market more rapidly.

The Findings and Recommendations of the Research

Based on consultations with various stakeholders in the research process and analysis of available data, the main factors that led to the lack of skills needed in the field of food safety in the labor market were identified. These shortcomings are caused on the one hand by the lack of employment opportunities in the labor market, and on the other hand by the limited opportunities of educational programs to provide qualified and appropriate skills training.

Following findings have been established during the research:

- **There is a need for qualified staff in the labor market, but there is no qualified staff to meet the demand** - today, there are more than 45,000 food business operators in the Georgian market, and as for food safety specialists, there are no accurate statistics on their number. According to the information provided by the respondents employed in the public sector, there are up to 5,000 staff in the market specializing in food safety. On average, according to these data, there are nine jobs per specialist, however, despite the shortage of staff, graduates of related programs of food technologies and food safety are still a problem in employment. This fact gives us reason to conclude that the problem is not the scarcity of jobs, but also the lack of staff with proper qualifications and skills. Because of this, food business operators prefer to provide their own training for existing staff and are less interested in hiring graduates of higher education programs.
- **Cooperation between universities and employers is weak, which is why higher education institutions are unable to provide adequate support to their graduates in the employment process, resulting in increased interest in food safety and food technology, although the focus on educational programs is reduced.** The majority of students surveyed (56%) say they are interested in educational programs in the field of food, although most of them (35%) choose another profession. The reason for this is the lack of career development and employment opportunities, as well as low pay. Nevertheless, a survey of employers and labor market participants revealed that due to the lack of qualified specialists, often employers in the private sector are willing to hire staff with the necessary knowledge and skills at a much higher wage than the average wage. This discrepancy between students' perceptions and employers' priorities gives us reason to conclude that cooperation between universities and the private sector in terms of student employment and training of qualified staff is weak.
- **Existing undergraduate and graduate programs today fail to develop skills tailored to the needs of the labor market, which reduces the interest of the private sector in collaborating with educational institutions in the process of finding the necessary staff.** In addition to the fact that current curricula do not provide graduates with the qualification of a food safety specialist, subjects directly related to food safety (such as microbiology, biochemistry, food hygiene) are taught in fragments and do not have adequate time devoted to the curriculum. In addition, the bulk of the programs are limited to theoretical teaching of general subjects and fail to provide students with practical skills. As a result, graduates need to undergo a range of training, hands-on training, and internship programs to meet the qualification requirements set by the employer. This factor makes the private sector less interested in the recruitment process in collaboration with existing institutions, as undergraduate and graduate program graduates do not have the proper skills to adapt to the labor market in a timely manner.

Labor Market

- **There is a growing demand for food safety and quality specialists in both the private and public sectors, due to legislative changes in the field of food safety and increasing opportunities for food exports to the EU market** - As part of the EU association process, Georgia has gradually begun to adapt its regulations to the requirements of EU directives, which has increased the requirements for food business operators and, consequently, the need for food safety and quality specialists in the enterprise. The gradual approximation of legislation to the requirements of EU directives and, at the same time, the increase in the export of food products to the EU market, will be one of the incentives to increase the demand for food safety and quality personnel in the industry.
- **The shortage of qualified personnel in the field of food safety and quality is equally acute in both the private and public sectors, which is due to the weakness and limited opportunities of higher education programs to ensure the training of staff with appropriate practical and theoretical knowledge.** The lack of properly qualified staff was unanimously named by both the private and public sector representatives. At present, there are no higher education programs that provide training for food safety and quality specialists at the bachelor's level, and existing programs, which to some extent include the teaching of food safety subjects, fail to provide appropriate theoretical and practical knowledge to graduates. Because of this, enterprises often train their staff directly through on-site training or short-term training courses and training programs.
- **The main part of the demand for food safety and quality specialists is due to large and medium-sized organizations operating in the private sector** - The financial condition and scale of the enterprise play an important role in the decision-making process of hiring a food safety specialist by the enterprise. Today, the main demand for specialists in this field is created by large and medium-sized enterprises, which will be maintained in the future. Small business operators will be less able to hire qualified permanent staff in terms of food safety and quality, due to the lack of financial resources on the one hand, which limits the ability of a small enterprise to provide the required pay for qualified and knowledgeable staff, and on the other. On the other hand, such enterprises see little need for these specialists and prefer to spend limited financial resources on hiring other types of staff.
- **Demand for food safety and quality specialists in the labor market depends directly on the financial capabilities of private business.** One of the main priorities of dairy and meat products enterprises in Georgia is to minimize costs. Small-scale entrepreneurs are particularly reluctant to bring in outside staff and try to teach existing staff additional features, including food safety and quality control.

Educational Programs

- **At present, there are no independent undergraduate or graduate programs in Georgia in the field of food safety and quality** - in Georgian universities, undergraduate and graduate programs in most cases, there are food technology programs where food safety is taught as a separate subject. Consequently, there is less concentration on it as the main specialty and in most cases it is superficial training.
- **Education obtained under the Bachelor of Food Safety and Quality programs does not provide employment for graduates due to the specifics of the training, which does not cover the full range of food safety subjects, and does not include an adequate number of practical training hours-** Undergraduate degree is not sufficient for employment in the labor market specializing in food safety and quality. Students are forced to undergo various thematic trainings for retraining because their academic knowledge in terms of food safety and quality is limited due to the fact that undergraduate food safety education is fragmented in universities, in some cases teaching within a single subject or subject. The small number of credits and hours allocated for teaching the subject is insufficient

- **The difference between undergraduate and graduate programs is very small, which reduces the motivation of students to continue their studies in the same direction and try to find other alternatives.** Currently, undergraduate and graduate programs in similar fields at universities are not fundamentally different from each other: the titles of the subjects are similar, as are the lecturers. Students get the feeling that the university can not offer anything new for the master's degree. An additional problem is also that in many cases the master's programs are tailored to other faculty students.
- **Expenditures related to the accreditation of a comprehensive bachelor's / master's program in food safety and quality are an obstacle to the process of development of programs in this direction by universities.** The development of programs in the field of food safety and quality is associated with significant financial costs (remuneration of professors, purchase of reagents, depreciation of equipment, etc.). Lack of finances is a serious barrier to the development and development of a food safety and quality undergraduate or graduate program. Especially problematic is the laboratory infrastructure, which is associated with colossal costs. Lack of funding is a significant problem for both public and private educational institutions. Private and public universities prefer to develop programs in more sociology, law, economics, and the humanities that do not require laboratory infrastructure.

Recommendations

In order to train qualified specialists in the field of food safety and quality, it is important to take actions that will help adapt the curriculum to the needs of the labor market, increase students' interest and employment opportunities in these specialties, facilitate cooperation between the private sector and higher education institutions.

To achieve these goals, it is advisable to consider the following recommendations:

Recommendation 1: Establish independent undergraduate, graduate and doctoral programs in food safety and quality

Recommendation 2: In educational programs in the fields of food technology, food and food industry it is important to increase the practical component hours in order to acquire practical skills.

Recommendation 3: It is important to maintain the consistency of teaching disciplines in the educational program based on the importance of the subject;

Recommendation 4: The amount of credits for study disciplines should be determined based on the content and importance of the subject;

Recommendation 5: The study disciplines should not be combined and taught within one subject;

Recommendation 6: Increase the number of hours allocated to HACCP system training;

Recommendation 7: It is important to sharply differentiate between undergraduate and graduate programs and not to teach similar subjects at the second level;

Recommendation 8: It is advisable to review the prerequisites for admission to the programs in order to admit to the program those applicants who have some knowledge in the disciplines of the specialty; Prerequisites for admission to the program are the necessary disciplines for the specialty, such as biology, chemistry, etc.

Recommendation 9: Universities should proactively conduct information campaigns to provide detailed information about certain specialties and programs to entrants;

Recommendation 10: It is important and mutually beneficial to establish a close relationship between the university and the enterprises, which will facilitate the employment of students, as well as increase the relationship between theoretical knowledge and practical teaching;

Recommendation 11: Universities should have an adequate material and technical base and laboratory infrastructure in line with modern standards to ensure quality teaching and to help students ensure that the knowledge gained is put into practice;

Recommendation 12: Curriculum should be taught by qualified and hands-on staff who will promote quality education and student satisfaction, as well as increase the prestige and awareness of the curriculum;

Recommendation 13: It is important That students have more opportunities to participate in international exchange programs (eg Erasmus + and the like), which will help students deepen their theoretical knowledge and share foreign experience;

Recommendation 14: Close collaboration between universities and enterprises in curriculum development and updating will complement the theoretical and practical components, increase the rapid and timely reflection of labor market demands into curricula, and increase the gradual integration of graduates into the employment market;

Annex 1: List of Respondents Interviewed

Respondent	Organisation	Position	Date	Time
Public Institutions				
Lali Odishvili	NCEQE	Higher Education Quality Assurance Service Coordinator	20 January	11:00
Qetevan Laferashvili	Ministry of Environment Protection and Agriculture of Georgia	Deputy Head of Department	20 January	13:00
Vasil Basiladze	National Food Agency	Deputy Head of the National Food Agency	22 January	13:00
Tea Chaladze	Agricultural Scientific Research Center	HR Specialist	22 January	15:00
Educational Institutions				
Zurab Quchukashvili	Tbilisi state university	Head of Bachelor and Master of Food programs in the field of biosciences	20 January	15:00
Giorgi Qvarcxava	Technical University	Dean of the Faculty of Agrarian Sciences and Biosystems Engineering	20 January	17:00
Dato Zarnadze	Tbilisi State Medical University	Professor	21 January	15:00
Nino Mazmiashvili	Gori State Teaching University	Director	29 January	11:00
Luka Nachkebia	Georgian Agrarian University	Lecturer	01 February	15:00
Consulting agencies				
Ivane Didberidze	ISO-Consulting	Director	25 January	11:00

Rezo Kobakhidze	C. Natadze Scientific-Research Institute of Sanitation, Hygiene and Medical Ecology	Director	26 January	11:00
Specialists				
Tamaz Makhareishvili	Restaurant Republic	Hygienist	21 January	11:00
Tereza Tsulikidze	Tsiskvili	Food Safety and Quality Specialist	21 January	13:00
Lasha Mandzulashvili	Sante GMT	Food Production Manager	25 January	13:00
Kakha Mukhishvili	Carrefour	Food Safety and Quality Specialist	25 January	15:00
Davit Torladze	Marshe	Food Safety and Quality Specialist	25 January	15:00
Dea Fochkhidze	Ori Nabiji	Food Safety and Quality Specialist	25 January	17:00
Maka Guguchia	WMBLD Georgia	Food Safety and Quality Specialist	25 January	17:00
Nino Lepsaia	Nikora	Food Safety and Quality Specialist	26 January	13:00
Employers				
Qeti Ormotsadze	Nikora	HR Specialist	27 January	15:00
Tatia Arabidze	Blaunshtein Georgia	Director	27 January	15:00
Zeinab Abuladze	GMT Tsintskaro	Founder	28 January	12:00
Keso Chachava	Marshe	HR Specialist	28 January	15:00
Nodar Sikiashvili	New Meat 2018	HR Specialist	28 January	17:00

Meri Fantsulaia	Kvarlis Baga	HR Specialist	29 January	11:00
Aleqsi Tskrialashvili	Alpuri	Founder	29 January	13:00
Tamar Kurpeishvili	Sante GMT	HR Specialist	29 January	14:00
Lasha Matiashvili	Heretuli	Founder	29 January	18:00
Natia Ubilava	WMBLD Georgia	HR Specialist	03 February	15:00

Focus group with students			30 January	15:00
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Annex 2: Profiling of Existing and/or Potential Key Organizations in Food Production Industry

Manufacturers of milk and meat products			
Name	Profile	Address	Contact info
Sante GMT Products Ltd.	"Sante GMT Products" was founded in 1997 on the basis of Tbilisi Dairy Plant. Dairy Plant was functioning in the 50s and was the largest milk producing spot in the Transcaucasia. Since 2016, "Sante GTM Products" has become a member of the Worlds Dairy Products Market Leader Group-"Lactalis". Since 2011 Sante GTM Products is actively investing in the development of milk reception infrastructure, which will make it the biggest company in Georgia for milk reception and production.	Tbilisi, Isani-Samgori district, Kakheti highway 10 km.	Contact person: Giorgi Dekanosidze Head of Dair Procurement
Marshe Ltd.	Marshe is a centralized enterprise with a project cost of 30 million euros. Up to 300 types of products are centrally produced in the complex. "Marshe" has 4 main production directions: fish, sausages, semi-finished products and bakery products.	Tbilisi, Didube-Chugureti district, T. Eristavi st. 5	Contact person: Keso Chachava, Head of HR
JSC Nikora	"Nikora" is one of the most successful food producers on Georgian market. The company was founded in 1998, soon gained a leading position and formed as a strong holding. Business, started with the producing of two kind of sausage, turned into several enterprises, large-scale distribution network, retailing units of company's subsidiary's and importer companies. Nowadays company produces up to 500 kinds of product. "Nikora" owns more than 280 retailing units of "Nugeshi", "Libre" and "Sunday" and the number of employees of the company is more than 6000.	Tbilisi, Gldani-Nadzaladevi district, m. Kavtaradze st. 11	Contact person: Guram Tsertsvadze Head of the Supervisory Board
Blaunstein Georgia Ltd.	The idea came to life in 2008 and Georgian-Swiss company "Blauenstein Georgia" was founded. The company uses Georgian traditional methods as well as successfully applies European standards and recipes to produce natural products. "Blauenstein Georgia" was the first who started producing aged meat in Georgia. This accentuates that the company not only employs Georgian traditions but also successfully deals with modern-day challenges. Today, "Blauenstein Georgia" already has about 800 cattle. The company aims to raise 7,000 head of cattle in the region. In 2018, the construction of a pig farm began, which will be implemented in four stages and will be designed for 224 mother pigs.	Racha-Lechkhumi and Kvemo Svaneti, Oni district, Shardometi	Contact person: Tatia Arabidze Director

Kvarlis Baga Ltd.	Kvareli Baga "is the largest dairy company in Georgia with the aim of introducing modern and international standards of dairy production in the region. The company was founded in 2010, in Kvareli, Kakheti. The location of the farm was selected with a particularly favorable climatic conditions and fertile lands. Today, the company has about 1,500 heard, specifically selected Holstein breed with the daily milk production of 22, 000 liters. „Kvareli Baga” also owns 450 hectares of land, mainly producing silage, corn, alfalfa, wheat and natural products for cattle feeding.	Kakheti, Kvareli district, Tsitskanantseri	Contact person: Meri Pantsulaia HR Service
Mitana Ltd.	LLC "Mitana" is one of the growing and young companies in the Georgian business space, it has appeared on the market since February 2008 and since then has maintained growth trends. "Mitana" is one of the companies that received ISO 22000 as the highest quality certificate. This certificate evaluated the work of the management and confirmed that the company owns food safety management systems.	Tbilisi, Gldani-Nadzaladevi district, Chkondideli st. 56	Contact person: Tamazi Niparishvili Director
Leader Food Ltd.	The company "Leaderfood" has been operating and supplying meat products throughout Georgia since 2009. From the fall of 2017, production continued in a new large-scale enterprise, which was implemented with the co-investment of the project "Produce Georgia" of the Ministry of Economy. The total area of the enterprise is 1 hectare and is located in Mtskheta. Leaderfood currently produces over 100 type of meat products, including: sausages, sausages, delicacies, serving dishes and sauces. Leaderfood is supplied with raw materials by the German company Tönnies, which is considered one of the largest suppliers in Europe and the developed world.	Tbilisi, Vake-Saburtalo district, m. Kostava st. 69	Contact person: Levan Buskivadze Director
German Butcher Ltd.	The company "German Butcher" was founded in 2010. Georgian and foreign technologists have created the highest quality meat products. Today, the company's products are successfully sold throughout Georgia. The production also has ISO: 22000 certification, which guarantees the highest quality.	Tbilisi, Isani-Samgori district, Gr. Lortkipanidze st. 12	Contact person: Giorgi Jangidze Director
Soflis Nobati Ltd.	LLC Soflis Nobati is owned by the Russian company Wimm-Bill-Dann, which itself has been owned by the American Pepsico since 2010. Dairy processing plant in Georgia produces kefir, yoghurts, sour cream and other products under the brand of "Soflis Nobati".	Tbilisi, Isani-Samgori district, Javakheti st. 15 a	Contact person: Nunu Porchkhidze Director

Tsalka Ltd +	The enterprise equipped with modern standards was established by IP Valeri Kakhadze with the financial support of the state, within the framework of the "United Agro Project". A total of 500,000 GEL was invested in the enterprise. The enterprise processes an average of eight tons of milk per day and makes three types of cheese: factory, sulguni and Imereti. The processing plant employs 24 people. Product sales are targeted at the local market.	Kvemo Kartli, Tsalka district, dome	Contact person: Valeri Kakhadze Director
Milken Ltd.	The company has been producing natural dairy products since 2012. In 2014-2015, with the funding of the Swiss Foundation and the help of the non-governmental organization "Mercy Corps", the enterprise was equipped with modern equipment.	Kvemo Kartli, Rustavi, 15 m / r surrounding area	Contact person: Iveri Gabarauli Director
Ltd Akhali Khortsi +	The company owns both the slaughterhouse and sells meat products. The company currently has 5 employees.	Tbilisi, Didube-Chugureti district, Agladze st. 32	Contact person: Nodar Sikiashvili Director
Milk Ltd.		Tbilisi, Isani-Samgori district, Krtsanisi st., N 16, cor. 3, b. 32	Contact person: Saba Eliava Director
Ltd. Alpuri	The company is engaged in the production of Imeruli and Sulguni cheese. The company has introduced ISO 22000 and also has established HACCP Group. In total, the company employs 12 staff.	Tbilisi, Didube-Chugureti district, Chitaia st. 39 a	Contact person: Alexi Tskrialashvili Director
Tsintskaro Ltd +	Tsintskaro + Ltd was established in 2016. The enterprise collects raw milk daily from 250-300 milk suppliers living in the villages of Tetrtskaro and Marneuli municipalities. The enterprise collects and processes 2.5 - 3 tons of raw milk daily. HACCP system is introduced in the enterprise	Tsintskaro village, Tetrtskaro municipality	Contact person: Zeinab Abuladze Director
Heretuli Ltd.	Heretuli Ltd. produces 100% natural products from completely healthy milk. It is a family type enterprise, where the HACCP system is also introduced.		Contact person: Lasha Matiashvili, Director

Tsipora Samtskhe Ltd.	Tsipora-Samtskhe Ltd., was established in 2011. The enterprise collects 3-3.5 tons of raw milk daily from dairy farms (on average 600-700 farmers). The amount of raw milk collected and processed daily by the enterprise reaches 14 tons. The enterprise employs 24 employees. Tsipora-Samtskhe Ltd has introduced HACCP system.	The village. Uraveli, Akhaltsikhe Municipality	Contact person: Amiran Kachkachishvili Director
Cooperative Disveli	Cooperative Disvel was founded in 2014. The enterprise collects raw milk from up to 100 farmers and processes 2.5 tons of raw milk daily. The enterprise employs 9 employees. The enterprise has introduced HACCP system.	Kvemo Kartli, Bolnisi district, Disveli	Contact person: Meri Makharadze
State Institutions			
National Food Agency	The National Food Agency is a legal entity of public law under the Ministry of Agriculture of Georgia, established on the basis of the Law of Georgia on Food Safety and Quality. The Agency was established as a legal entity under public law on January 3, 2011. It was set up on the basis of the National Food Safety, Veterinary and Plant Protection Service.	Tbilisi, Marshal Gelovani 6.	Contact person: Vasil Basiladze Head of Food Safety Department
Ministry of Environment Protection and Agriculture of Georgia	The Ministry of Environment Protection and Agriculture of Georgia is an institution of the executive power established in accordance with the law, which exercises the powers granted to it by the legislation of Georgia in order to ensure the implementation of state governance and state policy in the field entrusted to it.	Tbilisi, Marshal Gelovani 6.	Contact person: Ketevan Laperashvili, Department of Agriculture, Food and Rural Development Deputy Head
National Center for Education Quality Development	The Center, for the purpose of external quality assurance, carries out authorization of educational institutions and accreditation of educational programs, as well as monitors implementation of authorization and accreditation standards. The Center works on improving the external as well as the internal quality assurance mechanisms, its implementation and creation of relevant recommendations.	Tbilisi, Merab Aleksidze Street, Second Lane N 2	Contact person: Lali Odishvili Higher Education Quality Assurance Service Coordinator
Agricultural Scientific Research Center	The aim of the center is to develop modern technologies for storage and processing of agricultural products, to find, restore and improve local breeds and populations of insects useful for agricultural and domestic animals, birds, fish and fish in Georgia; Research-adaptation of cultural varieties introduced in Georgia, etc.	Tbilisi, Marshal Gelovani 6.	Contact person: Tea Chaladze Head of HR Service
Consulting companies			

G.Natadze Research Institute of Sanitation, Hygiene and Medical Ecology	The Institute was established in 1926 on the basis of the Physico-Chemical Laboratory as a Scientific Institute of Hygiene and Sanitation. The institute currently has 40 employees. The main directions are laboratory research, expertise and consulting services. Consulting includes research, training, standards implementation and evaluation.	Tbilisi, Old Tbilisi district, d. Uznadze st. 78	Contact person: Rezo Kobakhidze Director
ISO-Consulting	ISO-Consulting is a team of professional consultants, experts and auditors specializing in providing consulting, training and evaluation in accordance with ISO standards.	Tbilisi, Tornike Eristavi st. 6	Contact person: Ivane Dediberidze Founder
GDCI	The company has been offering food safety and quality consulting services to clients for more than 11 years.	Tbilisi, Burdzgla st. N74, Office N5	Contact person: Ekaterine Kimeridze, Director
Food Safety Consulting Center	The Center offers companies to assess the condition of the kitchen of food establishments (Food Safety Audit) according to international food safety standards and local requirements. Also advises on local and international food labeling standards, conducts trainings for business operator service personnel on local and international food safety requirements. One of the services of the company is also the introduction of the HACCP system and the internal standard for business operators	Tbilisi, Navtlugi st. 16	
Star Consulting Ltd	Star Consulting Ltd. was founded in July 2012. The purpose of its establishment was to provide consulting services in the process of development and implementation of food safety and quality management systems, to conduct staff qualification and awareness raising trainings in these areas. The company was selected from the very beginning and signed an agreement with the international non-governmental organization "Mercy Corps". Within the framework of the project, the consultants of "Star Consulting" Ltd. conduct small assessments of small and medium enterprises throughout Georgia, introduction of sample hygiene practices, staff training, awareness raising activities of suppliers.	Tbilisi Antonovskaya 9b, apartment # 43	Contact person: Ekaterine Burkadze Founder
Ltd. Management Systems	Management Systems Ltd. is the official partner of the German certification body TÜV SÜD Management Service GmbH in Georgia. Management Systems Ltd, through local and foreign experts, is consulting with several hundred companies to develop and implement a quality management system.	Tbilisi, N. Bokhua st. 4	Contact person: Elguja Meladze

Ltd. STR-Consulting	STR-Consulting offers consulting services to companies to help them more effectively manage, improve and develop the core processes of the company. Consulting includes the following international systems and standards: Quality Management ISO 9001: 2015; Ecology ISO 14001: 2015	Batumi, Melashvili st. 26, 3rd floor	Contact person: Tamaz Turmanidze
Educational Entities			
Ivane Javakhishvili Tbilisi State University	The oldest and largest higher education institution in Georgia. Currently, the number of students reaches 30,000 every year, and the number of professors-teachers reaches 3,000. The university has 7 faculties, about 60 scientific research laboratories and centers, a rich scientific library (with up to 4 million books and periodicals), 7 museums, as well as its own publishing house and printing house.	Tbilisi, I. Chavchavadze Ave. N1	Contact person: Zurab Kuchukashvili Head of Bachelor and Master Food programs in Biosciences
Tbilisi State Medical University	The main center of higher medical education and science in Georgia. At present, TSMU has the following faculties: Medicine (Georgian, English sectors), Public Health and Management, Dentistry, Pharmacy, Physical Medicine and Rehabilitation, Foreign Languages. Tbilisi State Medical University has 51 departments and 71 directions. The university has a total of 3369 employees and 6829 students.	Tbilisi, Vazha Pshavela Avenue 33	Contact person: Dato Zarnadze Professor
Georgian Technical University	Georgian Technical University is the largest and most important technical higher education institution in Georgia. The university currently has 8 faculties and 28 departments, with up to 12,000 students, 1,500 professors and staff members each year.	Tbilisi, 77 Kostava Street	Contact person: Giorgi Kvartskhava Dean of the Faculty of Agrarian Sciences and Biosystems Engineering
Georgian Agrarian University	It is one of the fastest growing higher education institutions in Georgia. Georgian Agrarian University unites 4 faculties: Faculty of Agrarian and Natural Sciences, Faculty of Engineering and Technology, Faculty of Business Administration and Free Sciences.	Tbilisi, Davit Agmashenebeli Alley # 240	Contact person: Tea Urushadze, Dean
Akaki Tsereteli State University	Akaki Tsereteli State University is a multidisciplinary higher education institution that implements academic and professional programs and engages in active research activities. Akaki Tsereteli State University offers the following faculties: Faculty of Humanities, Faculty of Pedagogy, Faculty of Exact and Natural Sciences, Faculty of Business, Law and Social Sciences, Faculty of Medicine, Faculty of Engineering, Faculty of Engineering, Faculty of Engineering, Faculty of Engineering.	Kutaisi, Tamar Mepe # 59	

Batumi Shota Rustaveli State University	At present, the university has about 6000 students studying in higher professional, bachelor, master and doctoral education programs. It includes 9 faculties: education, economics and business, law, natural sciences and health, social and political sciences, technology, computer science, tourism, computer science and humanities.	Batumi, Rustaveli / Ninoshvili st. 32/35	E-mail: info@bsu.edu.ge
Iakob Gogebashvili Telavi State University	One of the oldest educational centers in Kakheti. Founded in 1940 as the Telavi Pedagogical Institute. Studying at the university has three levels: undergraduate, graduate and doctoral programs. The university also runs a higher professional education program.	Telavi, Georgian University Street N1	E-mail: info@tesau.edu.ge
Gori State Teaching University	Gori State Teaching University was established as a result of the merger of Gori State University with Tskhinvali State University. The University has been offering professional undergraduate and graduate programs since 2008.	Gori, Chavchavadze St., 53	Contact person: Nino Mazmiashvili Director