



DEVELOPMENT OF GEOLOGICAL EXPLORATION WORKS IN UZBEKISTAN AND ORGANIZATION OF COST ACCOUNTING

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Abstract

The article describes the specific features of cost accounting in geological exploration, the structure of cost classification in them and the procedure for accounting. Scientific proposals and practical recommendations are formulated to improve costs in the field of geology.

Keywords: Geological exploration, costs, product cost, calculation, direct costs, fixed costs, variable costs.

ЎЗБЕКИСТОНДА ГЕОЛОГИЯ-ҚИДИРУВ ИШЛАРИНИ РИВОЖЛАНИШИ ВА ХАРАЖАТЛАР ҲИСОБИНИ ТАШКИЛ ҚИЛИШ

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РАЗВИТИЕ ГЕОЛОГИЧЕСКИХ РАЗВЕДОЧНЫХ РАБОТ В УЗБЕКИСТАНЕ И ОРГАНИЗАЦИЯ УЧЕТА ЗАТРАТ

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Аннотация:

Мақолада геология-қидирув ишларида харажатлар ҳисобининг ўзига хос хусусиятлари, уларда харажатларни туркумлаш тарқтиби ҳамда бухгалтерияда ҳисобга олиш тартиби баёни келтириб ўтилган. Геология



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соҳасида харажатларни такомиллаштириш юзасидан илмий таклиф ва амалий тавсиялар шакллантирилган.

Калит сўзлар: Геология-қидирув, харажатлар, маҳсулот таннари, калькуляция, бевосита харажатлар, ўзгача харажатлар, ўзгарувчан харажатлар,

Аннотация:

В статье описаны особенности калькуляции затрат в геологической разведке, структура классификации затрат в ней и порядок учета. Сформулированы научные предложения и практические рекомендации по повышению эффективности калькуляции затрат в геологической сфере.

Ключевые слова: Геологическая разведка, затраты, себестоимость продукции, расчет, прямые затраты, постоянные затраты, переменные затраты.

Introduction

Geological exploration (G&E) is distinguished from other industries by its high risk, uncertainty of results, and capital intensity. These characteristics require special approaches in accounting. The unique nature of geological exploration and the uncertainty of its results (Risk) mean that expenditures do not always lead to the discovery of profitable mineral deposits. This creates complexity in recognizing expenses as an asset (capitalization) or as an expense of the period. The phased nature of the work consists of design, exploration, appraisal, and prospecting stages. Each stage is treated as a separate accounting object. The long-term nature of the process—from mine development to its operation—can span years. This leads to a large volume of work-in-process inventory. Regional dispersion and distance mean that work is conducted far from the company's base, in desert or mountainous areas. This results in a high proportion of transportation and logistics costs. Seasonality: in some regions, work is only carried out during certain times of the year (e.g., spring-fall), which requires a specific method for allocating labor costs and equipment depreciation. From this



perspective, the organization and improvement of cost accounting in the field of geology is a pressing issue.

Review of literature

In the current National Accounting Standard, expenses are defined as follows: "Fair presentation is the consequences of transactions, events, and conditions in accordance with the Conceptual Framework for the preparation and presentation of financial statements (reg. no. 3530, July 12, 2024) requires a fair presentation in accordance with the definitions and recognition criteria for assets, liabilities, income, and expenses set forth in the Conceptual Framework for Financial Reporting and Presentation"[1].

In addition, various aspects of expenses are governed by the following standards: IFRS 1 ("Accounting Policies, and Financial Reporting") sets out the general principles for the recognition and disclosure of expenses.

PS 21 (Accounting Plan) specifies how expenses are recorded in journal entries (for example, 9400 "Period Expenses" or 9100 "Cost of Goods Sold").

PSB 24 ("Accounting for Expenses on Loans") explains the procedure for capitalizing or expensing interest and loan-related costs.

In Russia, the fundamental definition of an expense is provided in PUB 10/99, which is almost identical to the Uzbek standard. FASB 14/2022, on the other hand, regulates only when expenses related to intangible assets should be recognized as an asset and when they should be recorded as an expense in the income statement [2].

In Kazakhstan, in accordance with the National Financial Reporting Standard (NFR/IFRS), expenses are defined as follows: "Expenses are a decrease in economic benefits during the reporting period in the form of an outflow or an exhaustion of assets or an emergence of a liability, this results in a decrease in equity, not in connection with the distribution of capital among the entities (participants)" [3].

In the legislation of the Republic of Uzbekistan, particularly in the areas of accounting and taxation, there are two approaches to the concept of expenses.

1. According to the National Accounting Standards (NAS), expenses are the decrease in economic benefits during the reporting period in the form of an



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outflow or reduction of assets or an increase in liabilities. In this approach, expenses reduce the company's capital, and situations involving the distribution of capital among the owners (shareholders) (for example, paying dividends) are not considered expenses.

2. According to the Tax Code, expenses are classified as deductible and non-deductible when calculating profit tax [4].

A. Karimov divides expenses into two types: direct and indirect expenses, and also notes that expenses classified as conditionally variable are of particular importance [5]. L.P. Krasnova defines costs as “an economic benefit that is reduced during the reporting period as a result of the outflow of assets (cash funds, other property) or the emergence of liabilities, which leads to a decrease in the enterprise's capital” [6]. defined. This definition primarily distinguishes between costs, such as manufacturing costs (which form the product's cost of goods sold) and period costs (related to selling and administrative activities). This approach is consistent with the definitions in international standards and the national accounting system.

Numerous scientific studies and research have been conducted in our country on the methodology for accounting for, analyzing, and auditing costs. In some of these, costs are approached as intellectual capital, while other economists have researched them by industry and sector. M.K. Pardaev: “The article highlights the cost items that form the cost of goods (work, services), their dependence on production volume, and methods for assessing efficiency” [7]. According to A. Ibragimov, auditing is not only the process of searching for errors but also of providing reliable information about business activities and confirming the efficiency of resource use.

N. Karimov's research (especially in the case of banks and large enterprises) highlights the role of internal audit in risk management. He describes internal audit as a primary means of preventing internal embezzlement and strengthening internal control [8].

In the research conducted by A.Z. Avlakulov, internal audit is highlighted as a key tool for preventing internal fraud and strengthening internal control, in line with the requirements of International Financial Reporting Standards (IFRS) [8]. He emphasizes the necessity of reclassification based on IFRS requirements



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and the importance of risk-based approaches in organizing the audit of financial results. (IFRS) requirements" [9]. A.I. Alikulov, in his monograph *Theoretical and Practical Issues of Cost Accounting and Analysis*, emphasized the need to reclassify expenses in accordance with not only the National Standards of Accounting (NSA) but also the International Financial Reporting Standards (IFRS) and justified the importance of applying a risk-based approach and systematic control methods in organizing the audit of financial results [9].

In his monograph "Theoretical and Practical Issues of Cost Accounting and Analysis," A.I. Alikulov proposes a systematic grouping of costs according to their economic content, role in production, and method of calculation. In this, he outlines the methodological foundations for classifying costs as direct and indirect, as well as for including them in the product cost. A.I. Alikulov is primarily focused on demonstrating scientifically based methods for increasing a company's profit through cost optimization and reducing costs [10].

Methodology

In writing the article, general economic and logical methods were used: systematic analysis, induction and deduction, comparative analysis, as well as accounting and financial analysis methods: capitalization, "Successful Efforts," (Successful Efforts), impairment test, special methods of audit and control: risk-based audit, selective observation, digital and technological methods: GIS monitoring (Geographic Information Systems), Big Data and forecasting, and Blockchain technology methods were used.

Results and Discussion.

The history of the organization of geological exploration (GE) in Uzbekistan and the formation of its regulatory and legal framework is divided into three main periods.

1. Early geological exploration and the Soviet era (1920–1991): during this period, systematic geological research began in the territory of Uzbekistan.
2. The early years of independence and the legal foundation (1991–2016): after independence, the creation of the sector's national regulatory and legal framework began.



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3. Modern reforms and a new phase (2017 to present): The digitization of the sector and the transition to market economy principles are being implemented. In 2020, the University of Geological Sciences was established in the republic. In 2021, Resolution PP-5083 established the “Uzbek Geology Exploration” JSC, separating state governance from business management functions. In 2024, a new edition of the Law “On the Subsoil”

(URK-987) was adopted. It provides for increasing investment attractiveness and transitioning to international (JORC) standards. Geology reforms in Central Asian states: In recent years, the region's countries have paid special attention to improving the investment climate to develop their mineral raw material base. For example, the Republic of Kazakhstan aims to increase mineral extraction by 40 percent by 2029. Incentives such as VAT exemptions for financing geological exploration and 25% expensing of costs have been introduced, and geological and geophysical exploration is planned across 400,000 square kilometers. In 2024, the Kyrgyz Republic lifted the moratorium on the exploration and mining of uranium and thorium deposits. International Cooperation: Investment projects were launched with major companies like SRK Consulting and Metso during the “MINEX Central Asia 2024” forum held in Bishkek. The focus in the region is shifting to the exploration of critical minerals (lithium, cobalt, nickel) and rare earth elements, as these are crucial for the “Green Economy.”

A key feature of establishing ESG in developed foreign countries is the balance between government oversight and private investment. In Australia and Canada, geological reports can only be prepared by a “Qualified Person” with a special license. Foreign investors are issued “not contrary to national interests” certificates. In Chile, consultations with local communities (citizen participation) are mandatory for implementing the GQI, which prevents social conflicts. Strategic resources such as lithium, uranium, and thorium are under state control, and the state has the right of first refusal in their extraction.

Transitioning to international reserve-reporting standards (JORC and CRIRSCO) is of great importance. The JORC Code (Australia) is a professional practice code that classifies reserves based on geological reliability and economic viability. The CRIRSCO standard sets minimum standards for the disclosure of exploration results worldwide. It ensures the accuracy and



transparency of information when reporting to investors. It is integrated with the United Nations Framework Classification of Fossil Fuel Resources and Reserves (UNFC), facilitating the development of national strategies. International experience shows that in E&G, it is important not only to have government funding but also to incentivize the private sector and assess reserves based on international (JORC/CRIRSCO) standards.

**Table 1 Comparative Analysis of Regulatory and Legal Documents
Governing Geological Exploration (GEX) ¹**

| Criteria | Uzbekistan (Law on Subsoil, 2024) | Kazakhstan (Subsoil Code, 2018) | Australia & Canada (JORC / NI 43-101 System) |
|---|---|---|---|
| Licensing mechanism | Transparent selection through electronic auctions (E-auksion) | First come, first served principle | Competitive bidding or agreement with landowner (Exploration License) |
| Resource estimation standards | Transition from GKZ system to CRIRSCO and JORC standards | KAZRC (CRIRSCO-based national standard) is mandatory | JORC (Australia) and NI 43-101 (Canada) are leading global standards |
| Responsible persons institution | Competent Person legally established | Reports verified by PONEN independent experts | Only internationally certified Qualified Person signature is accepted |
| Exploration stages and duration | 5 years (extendable up to 5 more years) | 6 years (up to 15 years for rare metals) | Flexible terms (typically 2–5 years) |
| Environmental and social responsibility | Mandatory reclamation fund (liquidation fund) | Strict environmental insurance and social obligations | ESG standards are key requirement for investors |
| Data transparency | Partially open and digitized geological database | All data digitized via infrastructure data center | Most data is open and accessible online |
| Technogenic waste | Separate rights for use of waste (tailings, sludge) | Waste treated as extractable mineral resource | Tax incentives for recycling and circular economy |

¹ Тадқиқотлар натижасида муаллиф ишланмаси.



As a result of recent reforms, the Uzbek system has shifted from “administrative command” to an “investment partnership” model. From Kazakhstan's experience, it is considered beneficial not the “first-come, first-served” principle, but rather adopting 100 percent digitization of data. In the Australian and Canadian model, the main focus is not on state control, but on transparency to the exchange and investors (JORC). It serves to expand Uzbekistan's mineral and raw material base not only through the state budget but also through active private investments. It outlines five key priority areas that need to be integrated from international experience into national legislation.

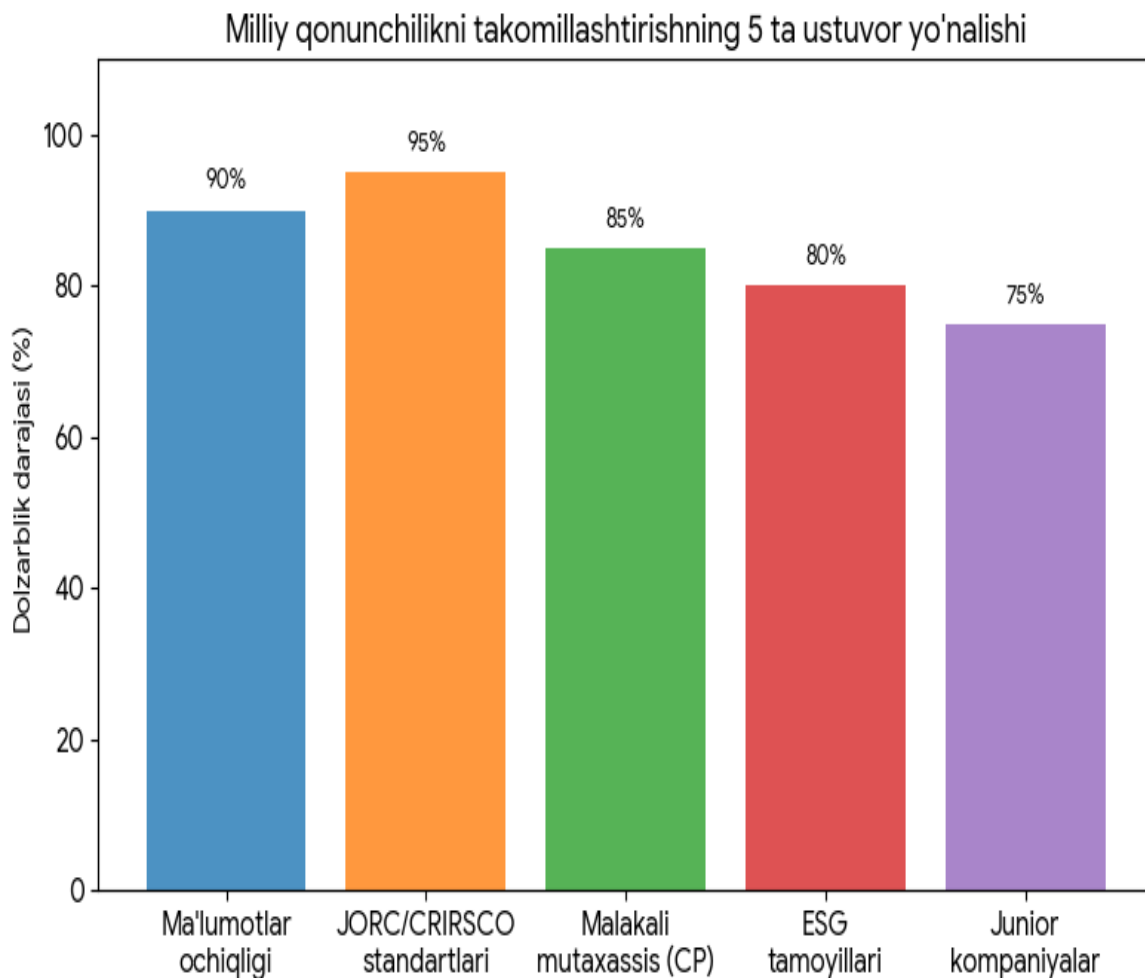


Figure 1. Key areas in which the mineral raw materials base must be integrated from international practice into national legislation.



Research conducted in geological exploration work shows that the following aspects are of significant importance:

1. Digitization and openness: Transferring geological data to an online platform based on the “Big Data” principle. This reduces an investor's pre-exploration costs by 20–30%.
2. International Standards: Adoption of the JORC Code enables local mines to be listed on the London or Toronto stock exchanges.
3. Human Capital (CP): Reports should be certified by a professional geologist with personal liability, not by a government agency. This reduces corruption and increases quality.
4. ESG Strategy: The environmental friendliness of exploration activities and their benefits to the local community are key conditions for attracting international grants and “Green” investments.
5. Junior Companies: The pace of new mine discoveries can be accelerated by providing incentives to small, mobile geological companies.

In the geological sector, 129.1 tons of gold and 6.7 million tons of coal were extracted, and a total of \$7.2 billion in investments was attracted to the sector. Of this, \$3.58 billion was directly absorbed by the Ministry of Mining and Geology and major enterprises (OKMK, NKMK). Exports of mining products amounted to nearly \$1.8 billion.

Table 2 Distribution of Investments in the Mining and Geology Sector²

| Organization | Investment Volume (\$ million) | Main Project |
|-----------------------|-----------------------------------|---|
| Almalyk MMC (AMMC) | 1,940 | Development of “Yoshlik-1” deposit (total project value: \$4.6 billion) |
| Navoi MMC (NMMC) | 789.6 | Increase production by 39% and modernization |
| Ministry of Geology | 572 | Expansion of mineral resource base |
| Navoiyuran SE | 126 | Increase uranium reserves |

² Тадқиқотлар натижасида муаллиф ишланмаси.



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Future plans and forecast indicators in the field of geology can be seen from the following information:

- In 2025-2026, the main emphasis was placed on digitizing the sector and extracting strategic metals needed for the “Green Economy.”
- Investments: An additional \$1 billion in direct investment is planned to be attracted to geology and mining projects in 2025.
- Production volume increase, bringing coal production to 10 million tons, Increase kaolin production by 50%.
- Metals: Uzbekistan Technological Metals Combine JSC is planned to produce 818 tons of molybdenum and 240 tons of tungsten concentrate.
- New capacities are expected to include the commissioning of the 3rd Copper Concentration Plant (MBC-3) at the Almalyk Mining and Metallurgy Combine and a new casting and rolling complex at the Uzbekistan Metallurgy Plant.

In the coming years, the following innovative solutions will be implemented in the field of geology:

The “Geomonitoring” system will be introduced to remotely monitor subsurface resource use and provide oversight via aerial and space imagery. Digital geology will involve converting all primary geological data, maps, and reports into digital format. NKKMK plans to issue another \$500 million in eurobonds on the international market in 2025.

The future plans for Uzbekistan's geology sector are outlined within the “Uzbekistan – 2030” strategy and the Mineral Raw Materials Base Development Strategy for 2026–2030. These plans are aimed at increasing the flow of investments, digitization, and expanding reserves of strategically important metals.

Investment and Economic Forecasts (2025–2030): Uzbekistan plans to attract over \$9.4 billion in total investment for geological exploration by 2030.



Table 3 Information on Investments in Geological Exploration.³

| Indicator | 2024 (Actual) | 2025 (Forecast) | 2030 (Target) |
|-------------------------|----------------------------------|-----------------|----------------|
| Total Investments | \$7.2 billion (previous data) | \$8.5 billion+ | \$9.4 billion+ |
| Economic Size (GDP) | \$100 billion+ | 7.7% growth | \$200 billion |
| Level of Digitalization | Initial stage | 60% | 100% |

Strategic Directions for Geological Exploration Activities for the Next Five Years:

Expansion of mineral reserves – Accelerating the growth of reserves of hydrocarbons (oil and gas), ferrous metallurgy, and other mineral resources essential for key sectors driving the economy.

Transformation and digitalization – Digitalizing management systems in sector enterprises, creating a unified geological data platform, and implementing artificial intelligence technologies.

“Green” economy – Reducing environmental impact in geological exploration activities and adopting energy-efficient technologies.

Large-scale projects and production plans – Uranium extraction: the state enterprise Navoiyuran will continue developing new deposits under its investment program through 2030.

Ferrous metallurgy – A sector development strategy up to 2030 will be developed, aimed at expanding the use of domestic iron ore reserves.

Oil and gas sector – Investment projects will be implemented to explore new hydrocarbon fields and modernize existing ones to ensure uninterrupted energy supply to the domestic market.

- In 2025, a specialized program of measures will be implemented to retrain and upgrade the qualifications of personnel in the sector. Priority will be given to training specialists capable of working in accordance with international standards (including JORC and others).

³ Тадқиқотлар натижасида муаллиф ишланмаси.



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The implementation of these plans will contribute to Uzbekistan's goal of entering the top 50 countries in the Global Innovation Index by 2030.

Geological exploration activities (GEA) differ from other industrial sectors due to their high level of risk, uncertainty of outcomes, and capital intensity. These characteristics require specific approaches to accounting.

One of the key features of geological exploration is the uncertainty of results (risk), as invested funds do not always lead to the discovery of commercially viable mineral deposits. This creates complexity in determining whether costs should be recognized as assets (capitalized) or treated as period expenses.

Another important feature is the phased nature of activities, which include project design, prospecting, evaluation, and exploration stages. Each stage is treated as a separate accounting object.

The long-term nature of operations is also significant: the period from discovery to actual exploitation of a deposit may take many years. This results in a substantial volume of work in progress.

Additionally, territorial dispersion and remoteness are characteristic, as operations are often conducted far from enterprise bases, in desert or mountainous regions. This leads to a high proportion of transportation and logistics costs.

Seasonality is another factor: in certain regions, work can only be carried out during specific times of the year (for example, spring and autumn). This requires specific approaches to allocating wages and equipment depreciation.

Accounting Entries

When materials are consumed:

Dr 2010 (GEA object) – Cr 1000

When wages are accrued:

Dr 2010 – Cr 6710

Upon completion of a stage and submission of the geological report (if the result is positive):



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Dr 0400 (Intangible Assets – Exploration Assets) – Cr 2010/0800

If the result is negative:

Dr 9430 (Other Operating Expenses) – Cr 2010

Environmental and Rehabilitation Obligations

A specific feature of geological exploration activities is the obligation to reclaim land (restore it to its original condition) after completion of operations.

In accounting, a provision (reserve) must be created for this purpose:

Dr 2010 – Cr 8910 (Provision for Future Expenses)

The main emphasis in GEA accounting is placed on accurate cost tracking for each individual object (well or field) and the correct determination of criteria for recognizing these costs as assets.

Conclusion and Recommendations

The conducted analysis shows that, in order to increase investment attractiveness and ensure efficiency in the geological sector of Uzbekistan, it is advisable to continue reforms in the following directions:

First, enhancing the transparency and digitalization of geological data (based on the experience of Australia and Kazakhstan):

Geological data should not only be stored in state funds but also made available to investors through online interactive maps. This enables risk assessment prior to the initiation of exploration activities.

At the same time, it is essential to ensure a full transition to CRIRSCO and JORC systems for resource estimation by abandoning the national GKZ (State Reserves Commission) classification and adopting the JORC Code as a unified mandatory standard recognized by international stock exchanges. This will increase the global market value of domestic deposits.



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Second, developing the “Competent Person” institution:

This involves establishing independent professional associations of geologists and granting them authority to approve reports. Such a shift represents a transition from state control to a system of professional responsibility (as practiced in Canada and Australia).

Third, strengthening environmental and social obligations (ESG) at the legislative level:

Subsoil users should be required to comply not only with technical standards but also with ESG (Environmental, Social, and Governance) principles. This will elevate engagement with local communities and environmental restoration to international standards.

Fourth, encouraging junior exploration companies:

It is necessary to expand tax incentives for early-stage exploration activities, which are characterized by high risk. As in international practice, special financial and legal regimes should be introduced for “junior companies.”

Additionally, it is important to promote the economic utilization of technogenic deposits by simplifying regulatory frameworks for the recycling of mining waste (Circular Economy), thereby supporting the principles of “green” geology.

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12.А.З.Авлокулов «Молиявий натижалар ҳисоби ва аудити методологиясини такомиллаштириш» мавзусидаги докторлик (DSc) диссертацияси авт, 2018 – 48 б.

13.А.И.Алиқулов (профессор Б.А. Хасанов билан ҳамкорликда) чоп этилган «Амалий бошқарув ҳисоби» ва «Бошқарув ҳисоби» каби ўқув қўлланмалари