



Gem and Jewellery Research and
Training Institute

**Annual Report
2022**

Gem and Jewellery Research and
Training Institute
“Ruwan Sewana”
No. 73/5/A,
Welivita
28.02.2023

Hon. Minister
Ministry of Industries
P.O. Box 570,
73/1
Galle Road,
Colombo-03

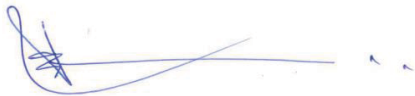
Hon. Minister,

Annual Report 2022

In terms of sub section 14 (2) of the Finance Act No.38 of 1971, the following documents are submitted to you.

1. The Administration Report of the Gem and Jewellery Research and Training Institute for the year 2022
2. The performance report as at 31st December.

Yours faithfully,



A.M.Rathnayake
Chairman
Gem and Jewellery Research and Training Institute

Vision

To be the Regional Centre of Excellence in Research and Training in the Gem and Jewellery Industry while facilitating the Growth and Development of the Industry in Sri Lanka

Mission

To enhance the Competitive capability of Sri Lanka Gem & Jewellery Industry by providing high quality Research & Training services, conducting workshops, Seminars, and by publication of books and papers on related subjects leading to Exploration of Gem Deposits, Technological Innovation, Skill and Competency Development and Quality Improvement for the satisfaction of our Stakeholders

Objectives

Explore gem resource potential areas of Sri Lanka and harvest these resources through sustainable methodologies, and contribute to the national economy by producing tradesmen with training in new technological methodologies.

2.1. Composition of the Board of Directors

The composition of the Board of Directors for the year 2022 was as follows.

01	Mr. A.M. Rathnayake	Chairman of the Board of Directors From 27.06.2022 to date
02	Prof. P.G.R. Dharmaratne	Chairman of the Board of Directors From 27.12.2021 to 26.06.2022
03	Mr. P.U.K. Thenuwara	Member of the Board of Directors From 31.01.2022 to 31.12.2022
04	Mr. R.M.D.K.G.N.B. Ranathunga	Member of the Board of Directors From 14.10.2021 to 31.03.2022
05	Mr. K.N.P. Jayarathne	Member of the Board of Directors From 01.04.2022 to date
06	Dr. Senarath Hevage	Member of the Board of Directors From 08.03.2022 to 31.12.2022.12.31
07	Mrs. Prabha Malalasekera	Member of the Board of Directors From 22.01.2020 to 08.12.2022
08	Mr. S.G.L.Fernando	Member of the Board of Directors From 08.02.2022 to date
09	Mr.S.A.W.K. Jayasekara	Member of the Board of Directors (Ministry's representative) From 31.01.2022 to date

Senior Management

Senior Management



Mr.A.M. Rathnayake

Chairman

(From 2022.06.27 to date)



Prof. P.G.R. Dharmaratne

Chairman

(From 27.12.2021 to date)
BAsc (SL),MSc (Newcastle),
Ph.D(Leeds),FIE,FGG,FGA,C.Eng



Mr. B.G.R.W. Wasantha Gamlath

Director General (Acting)

(From 23.11.2021 to date)
MSC (Gem),B.Sc (SP) (Physics) FGA,
MGA (SL),MBA(Reading)



Mr. B.G.R.W. Wasantha Gamlath

Director (Training and Development)

MSC (Gem),B.Sc (SP) (Physics) FGA,
MGA (SL),MBA(Reading)



Mr. R.M.N.P.K. Nalin Jayasinghe

Director (Research) / Acting

M.Phil(Gem.),M.Sc(GIS & RS),B.Sc.
(Geology),MIGSL,MGSSL,MGASL



Mr. S.L.J. Muhandiram

Assistant Director (Finance)

MPAcc(USJP),B.com (SP)Accountancy
2nd lower Hons (USJP),CBA(ICASL),
ADV.Cer (Procurement)(ICTAD)



Mrs.W.L.Prasangika Surendra

**Assistant Director
(Administration and Human Resources) Acting**

B.des,Jew(Sp)(UOM)

3. Chairman's Review of Opportunities and Challenges of the Year under review

3.1 Opportunities

- **Increasing the demand for research and training**

Local and foreign demand for the institution's services is growing. The high demand for skilled workers in this sector has led to the growth of this demand. The increased demand for the services is also the result of the recent measures taken towards improving the quality standards of the services delivered by the Gem and Jewellery Research and Training Institute. It also has the opportunity to satisfy the needs of the rapidly growing training market in the North and East areas.

- **Unfulfilled needs**

There are requirements that the service providers have not yet fulfilled for the field. Under the circumstances, there is a slowdown in systematic gem exploration, identification of primary gem deposits, upgrading of extraction technology and the transmission of quantitatively advanced technology to the industry as a whole.

- **Technological advancement**

There is also scope for the invention and introduction of new machinery for activities such as gem mining and color enhancement of gems.

- **Growth of the institution**

The institution also needs to be upgraded to have the capacity to offer degree courses in gem and jewelry in the Asia-Pacific region for serving the clients from various parts of the world.

- **Other potentials**

There are opportunities for providing various services for this sector by the relocation of Geuda heat treatment plants to other locations in Sri Lanka and establishment of research facilities.

- **Joint programs for the development of the industry**

There are opportunities to collaborate with the Central Environmental Authority on eco-friendly approaches to the gem industry, to cooperate with the National Gem and Jewellery Authority on research projects, and work together with other government agencies for various development projects.

- **Promotional programs**

Opportunities are open for the institution to launch publicity campaigns about its services, through awareness programs, magazines, leaflets and audio-visual presentations on gem and jewelry.

3.2. Challenges

- **Infrastructure facilities**

Urgent steps need to be taken to introduce modern equipment and machinery, training units and thereby providing the training, knowledge and skills required for the industry's advancement. The gem cutting unit and the gem laboratory in the jewelry training units require introduction of

state-of-the-art machinery. Further, a metal standardization unit should be set up and related courses should be introduced. Since diamond cutting is a unique industry in this industry, it is necessary to establish a relevant training unit to impart knowledge and take steps for related development activities.

- **Physical resources**

There is a shortage of vehicles required to carry out the work of the research and training division of the institute in a broader manner. There is also a need to upgrade laboratory facilities to meet current needs.

- **Backwards attitudes of employees**

Employees' having a negative attitudinal psychological background from the recent past.

- **Duplication of the institute's services by sister institutions.**

Examples: - training, laboratory services, etc. of the institute.

- **Human Resources**

According to the cadre plan approved by the Department of Management Services, our institution has a cadre of 136 employees and it currently employs 78 employees. Due to the limited training opportunities available locally for the research and training staff of the institute and the limited number of officers with subject knowledge in this field, there are less opportunities for referring the officers for training. Therefore, it seems that our staff is not sufficient to fulfil the present day demands of the industry. This situation is not conducive to the future of the industry and may affect the training demand of the institution. The solution to this situation is to provide local and foreign training opportunities to the staff of the institute as much as possible.

- **Financial Resources**

At present, the contribution of the Treasury to the funds required to carry out the activities of the institution in an expended manner is minimum and a suitable Cess tax system has not been set up to serve this purpose.

- **Establishment of training institutes by the private sector**

Private sector involvement in education in the field of gems and jewelery has gradually increased.

- **Lack of incentivizing in some sectors of the industry**

Examples - Cutting Service Division

4. Report of the Board of Directors

4.1. Objective

The Gem and Jewellery Research and Training Institute was established by Gazette Notification No. 882 dated 28th July 1995 in accordance with Section 25 (1) of the National Gem and Jewellery Authority Act No. 50 of 1993. The main objective of the Institute is regulation, promotion and development of the Gem and Jewellery Industry through research and training facilities in the industry.

4.2. Powers of the institution

Conducting surveys on gem minerals and their deposits in Sri Lanka and carrying out scientific research on the following related matters.

1. To conduct surveys on gem minerals in Sri Lanka
 - a) Location of gems
 - b) Identification of gems
 - c) Methods of enhancing gem stones.
 - d) Any other related aspects and gemmological research.
2. To provide Technical and other advice including invention of machinery for the development of the Gem and Jewellery Industry in areas such as mining, gem cutting, jewellery making, devices for the treatment of gem stones and making of jewellery.
3. To provide training in -
 - (a) Gem cutting
 - (b) Production of Jewellery;
 - (c) Gemology including diamonds;
 - (d) Jewellery designing;
 - (e) Enhancement of gem stones;
 - (f) Any other related aspects of the gem and jewellery industry
4. To conduct Workshops, Seminars and to publish Papers, Books on related topics, work done etc.
5. To do such other things as are necessary to facilitate the proper discharge of the functions of the Institute.



TRAINING DIVISION

5. Training Division

The main objective of the training division is to implement training courses and other development activities based on the concept of “from mining to market” to engage skilled craftsmen and skilled professionals who have the potential to lead the gem and jewelry industry towards strategic development.

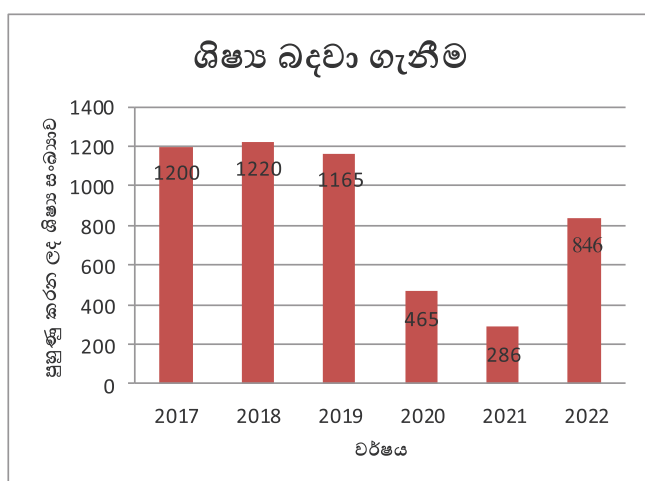
Progress in implementation of the training sector courses and development programs in the year 2022

1. 5.1.1. Conducting training courses aimed at vocational education.

The Training Division has implemented vocation-oriented and job-oriented training courses so as to cover the scope from mining technology to the introduction of large-scale production to the international market including value addition methods for products related to this industry. In the year 2022 too, the institute proceeded to implement the courses related to the corporate certificate level, NVQ 3-4 levels related to the national vocational qualification standard level and NVQ 5 related to the diploma level.

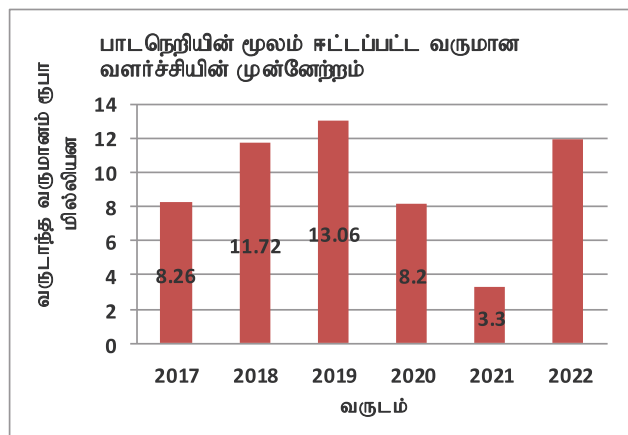
In the past three years, due to the various threats that had to be faced globally as well as the various socio-economic issues that had arisen locally, the institute operated to implement the training courses with great difficulty and in the year 2022 too, the training division had to carry on a majority of the courses that were started in the previous years. Consequently, compared to the previous years, the number of students expected to be trained in 2022 was 550. But since the training division has been able to manage the human resources more efficiently, the division has been able to train 826 students exceeding the expected level in the year 2022. Accordingly, in the year 2022, the total income generated by the training division through the implementation of the courses is 16.3 million rupees.

5.1.1 Progress of the student recruitment for training courses from 2017 to 2022



Year	Progress of student recruitment	Number of students who completed courses
2017	1200	768
2018	1220	782
2019	1165	665
2020	465	194
2021	286	137
2022	846	217

5.1.2 progress of the growth in the revenue earned through conducting training courses from 2017 to 2022

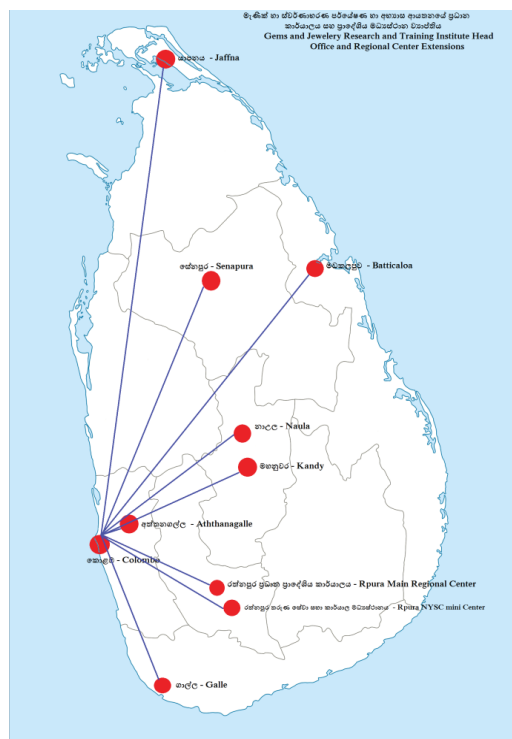


Year	Income Rs. Mn
2017	8.78
2018	11.55
2019	13.17
2020	12.82
2021	3.74
2022	16.3

5.2 Planning of Centers for Dissemination of Industry Related Training Knowledge

Vocational training education field can be described as a field where there is more tendency in the youth community towards vocational training education. Accordingly, recognizing this situation and increasing the contribution of the industrial sector to the local economic growth, the institute has started to conduct courses in the year 2022 targeting the people scattered all over the island to develop the fields of employment related to the gems and jewelry industry, which is one of the most prominent industrial sectors.

Under this, the division has worked to successfully maintain 10 new centers in Ratnapura, Kandy, Galle, Jaffna, Attanagalle, Batticaloa, Naula, Senapura, Ratnapura Youth Council in the year 2022, centered on the Kaduwela head office. The centers are as follows. |



01. Colombo 02. Ratnapura 03. Kandy
04. Galle 05. Jaffna 06. Batticaloa
07. Na ula 08. Attanagalla 09. Senapura
10. Ratnapura Youth Council

❖ **Starting a new training center at Senapura Vocational Literacy Training Centre.**

At the request of the Rehabilitation Commissioner General's Office, it was possible to start a gem cutting training unit of the institute in the premises of the Senapura Vocational Literacy Training Center in 2022 in relation to providing gem cutting vocational training to the young people who are being rehabilitated at the Senapura Vocational Literacy Training Center in Welikanda.

❖ **Establishment of a center in Ratnapura Youth Service Council.**

In accordance with the corporate concept of working together with all the vocational training institutes and utilizing all the human and physical resources available in the country to produce skilled technicians sufficient for the gem and jewelry industry, in the year 2022, we have been able to reach an agreement with the Ratnapura Youth Service Council and start a training center of the institute in the premises of the said center.

5.3 Training courses conducted related to gems and jewelry industry

This year, the division paid more attention to re-entering the course development activities of the institute, which had fallen behind due to the fact that the institution had to face the various socio-economic and politically problematic situations in the past three years. Thus, more attention was paid this year to conduct training courses in a way that could provide more orientation for the fields that are constantly changing in relation to the industry and for the fields where employment opportunities are abundant, and acted accordingly. Accordingly, the institute was able to implement the following courses in the year 2022 by adapting the technology that attracts the modern youth by managing the human and physical resources of the training division in the maximum and optimal way.

5.3.1 Training courses conducted relating to the gem industry.

- Basic Gemmology
- Gemmology
- Blended Gemmology
- Geuda Heat Treatment
- Gem Colourgrading & Marketing
- Gem Cutting & Polishing Course NVQ 3 / 4
- Gem Cutting – short term course
- Gemstone carving and bead jewelry manufacturing

5.3.2 Training courses conducted in the field of jewellery

- Jewelry designing
- Computer Aided Jewellery Designing
- Costume Jewellery Manufacturing
- Jewellery Manufacturing NVQ 3 / 4
- Jewellery Stone Setting NVQ 3

Training programme	Colombo	Ratnapura	Kandy	Galle	Attanagalla	Batticaloa	Naula	SEnapura	Ratnapura Youth Corps	Number of students who completed the course
Diploma in Gemmology	-	13	-	-	-	-	-	-	-	13
Basic Gemmology	81	64	-	-	-	-	-	-	-	145
Hybrid Gemology	22	-	-	-	-	-	-	-	-	22
Gemmology	83	56	-	-	-	-	-	-	-	139
gemology Short term	02	9	-	-	-	-	-	-	-	11
Geuda Heat Treatment	16	86	-	-	-	-	-	-	-	102
Gem Colourgrading & Marketing	-	24	-	-	-	-	-	-	-	24
10 Day Gem Cutting Course	05	11	-	-	-	-	3	-	-	19
Gem cutting and polishing	30	88	46	-	-	-	17	29	11	221
Gemstone carving	-	7	-	-	-	-	-	-	-	7
Jewelry designing	21	17	20	11	-	-	-	-	-	69
Computer Aided Jewellery Designing	17	-	-	-	-	-	-	-	-	17
Special Computer Aided Jewelry Design Short term course	01	-	-	-	-	-	-	-	-	01
Costume Jewellery Manufacturing	-	15	-	-	-	-	-	-	-	15
Jewelry manufacturing	03	-	-	-	12	8	-	-	-	23
jewelry manufacturing short tem course	03	-	-	-	-	-	-	-	-	3
Jewellery Stone Setting	16	14	-	-	-	-	-	-	-	30
Grand Total	300	404	66	11	12	8	20	29	11	861

5.4 Implementation of other development programs related to gems and jewelry industry.

5.4.1 Planning to establish a new training unit for developing precision gem cutting patterns.

Although small size gemstones are commonly found locally, the technology to scientifically cut and polish these gemstones with very high precision (± 0.002) is not widespread in the industry. Therefore, a project has been started to implement new training course programs to introduce this kind of gem cutting and polishing technology with scientific accuracy to the industry and its employees. The above projects will create the background for mass production of small size gems which are currently not used and are not used for value addition in the country. Through

this project, a large number of jobs are created locally and domestically. Accordingly, there will be opportunity to achieve many benefits economically, both directly and indirectly.

5.4.2 Taking action to adopt the national vocational qualification accreditation levels for training courses

The necessary documents have been forwarded to the Tertiary and Vocational Education Commission for the preparation of the National Vocational Qualification Standard Levels (NVQ) required for the following training courses related to the field of gems and jewelry and at present, the National Apprenticeship and Training Authority is carrying out field work related to the issuance of skill standards required for these courses.

- Jewellery Designing - NVQ 4
- Gem Identification - NVQ 4
- Gemology - NVQ 5
- Gem cutting and polishing - NVQ 5

For these training courses, related skill standards will be prepared in connection with the University of Vocational Technology to conduct the courses.

Work has been initiated in 2022 to review the gem cutting, gemmology and jewelry manufacturing curriculum to include a module on business management subjects.

1.1 5.4.3 Establishment of Quality Management System

In order to maintain a quality training and education system, the preliminary work required to establish a quality management system in accordance with ISO 9002 following the international standards was carried out in the previous years, and accordingly, the implementation of functions of the training division in accordance with those standards in the institution was carried out in the year 2022.



5.4.4 Conducting a certificate awarding ceremony.

In the year 2022, a certificate awarding ceremony was successfully held for the first time in the institution for 150 trainees who have studied the training courses under the Vocational Gemology Diploma Course and the National Vocational Qualification Accreditation Level 4.



5.4.5 Conducting publicity of courses and promotion activities.

Several course promotion programs were implemented to identify the training beneficiaries for the training courses implemented by the institute focusing on the year 2022.

Under this, participation was made in the interactive discussion program "Doramadalava" of the Independent Television Service. In addition to this, programs have been planned and provincial promotions, advertising campaigns and social media based advertising programs have been conducted to increase the awareness of the outside community about his field.

5.4.6 Conducting technical workshops for the sustainable operation of gems and jewelry industry.

In order to provide traditional industrialists with modern technical knowledge, industry-related technical workshops were conducted in the areas of Gampaha, Kegalle and Matale.

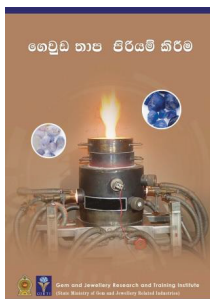
Under the gem carving and fashion jewelry manufacturing diversification project, an awareness workshop on credit schemes and financial management was held at the Ratnapura center for the project members and alumni industrialists with the resources of the Ceylon Industrial Development Board and the Regional Development Bank in 2022. Also, in collaboration with the Uva Wellassa University, a gem cutting training workshop was conducted for the technical science degree candidates of the university.



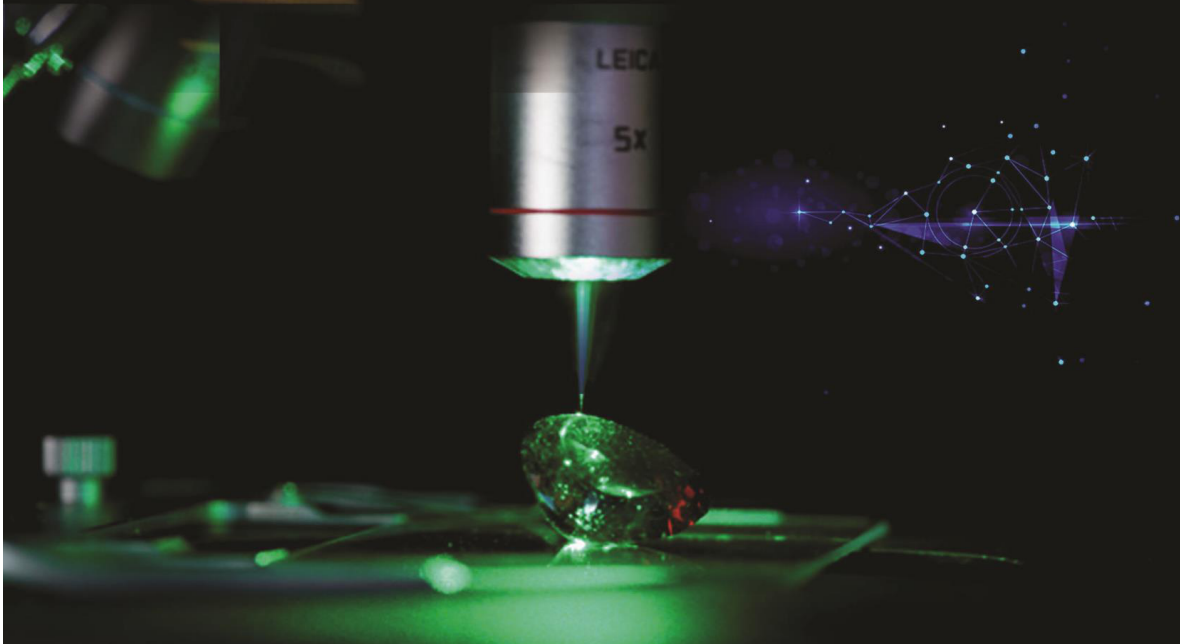
5.4.7 Printing of books as self-supporting training course studies.

Gemology
Domestic heat treatment
Gem cutting and polishing
Jewelry manufacturing

In the year 2022, it action has been taken to print books containing extensive details and information printed in such a way as to obtain more advanced knowledge for training courses and to sell these books to the training beneficiaries at a concessional price, and It has been found that there is a great interest and demand of trainees for these works.



RESEARCH DIVISION



6. Progress of 2022 research programs

6.1 Project :- Exploration and Appraisal of Gem Deposits in Sri Lanka

This project is implemented at the divisional secretariat level to obtain the Sri Lanka's gem deposits' contribution to the national economy as well as prepare a file of 1:50,000 scale maps. In this task, a relevant gem potential map and a technical report will be issued at the level of each divisional secretariat. Soil samples required for laboratory analysis were obtained by carrying out field investigations in the two Divisional Secretariat Divisions of Niagama and Kiriella, which could not be completed due to the imposition of mobility restrictions due to the COVID 19 epidemic situation in 2021. According to the results obtained from the study of those soil samples in laboratories as well as the information obtained from the topographical and geological data study, areas with gem potential were identified.

6.1.1 Niagama Divisional Secretariat Division

Gem high potential zones have been identified in Niagama South, Horangalla and Talgaswala areas in this division. Cats eye and Alexandrite gems are found in abundance in these areas.



(a)

(b)

(c)

*Figure 01 – (a) and (b) – the formation of layer of the gem vein
(c) Microscopic observation of alexandrite and chrysoberyl gem particles*

In the last quarter of 2022, it was not possible to complete the planned field expeditions in Niagama Divisional Secretariat due to lack of financial allocation. The project is expected to be completed in the first quarter of 2023.

6.1.2 Kiriella Divisional Secretariat Division

In this division, about 70% of the field surveys have been completed. Gem high potential zones have been identified in Epitawala, Yatipahuwa, Allagawa, Tanthiriwatta, Galathura, Madabaddara, Thomkotuwa, Dodampe, Nadunwehera. Diylu gem deposits and gold deposits are located near the Kaluga River and Diylu gem deposits are also located near the Kuru River. alluvial gem deposits and gold deposits are located near the Kalu Ganga River and alluvial gem deposits are also located near the Kuru Ganga River as well. Blue and white sapphire, Geuda, all types of Spinel, Zircon, Garnet, and Blue Apatite are leading

among the gems found in these areas. As a whole, the gem vein in this area is located at a depth of 10-20 feet and this is a Divisional Secretariat area with high gem potential.



(අ)

(ආ)

*Figure 02 – Microscopic observation of (a) blue sapphire
(b) yellow sapphire and pink spinel gem particles*

In the last quarter of 2022, it was not possible to complete the planned field expeditions in Kiriella Divisional Secretariat due to lack of financial allocation. The project is expected to be completed in the first quarter of 2023.

6.1.2.1 Ayagama Divisional Secretariat

In Ayagama Divisional Secretariat, initial field survey activities were started and the relevant local authorities were informed. During the initial exploration, samples were collected in the vicinity of the ongoing mines and along the rivers. Due to the lack of budget allocations, these projects had to be postponed for the next year.



Figure 03 – Exploration in the areas of the Ayagama Divisional Secretariat

6.1.2.2 Pelmadulla Divisional Secretariat

A workshop was held to promote gem mining in areas with high potential.



Figure 04 – Awareness workshops

6.3 project :- Establishing a baseline for gemstone valuation

This project has been completed by developing a computer application to evaluate gemstones, according to this project.

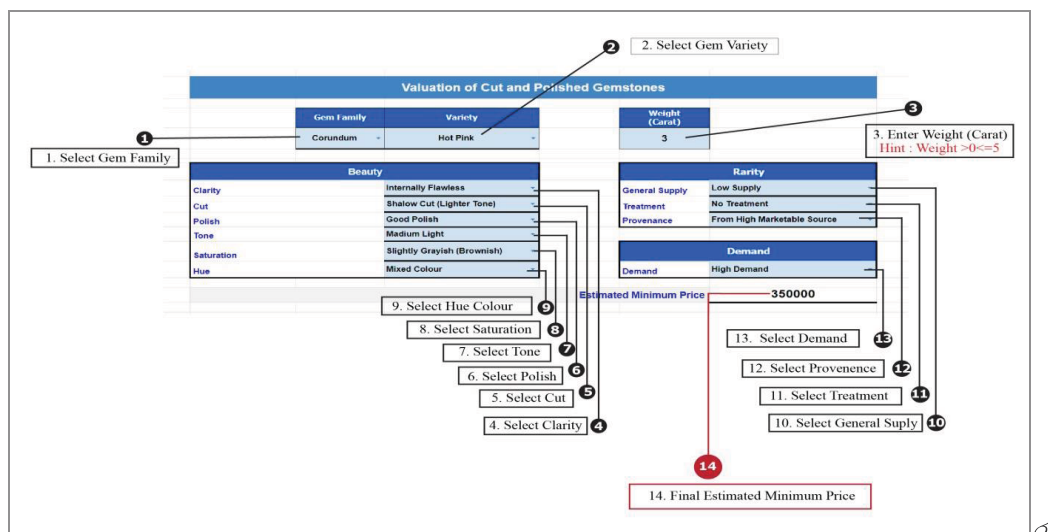


Figure 06 - The interface of the application

6.4 Project :- Technical Guidelines for Restoration of Gem Mining Lands

The report containing technical guidelines for gem mining land rehabilitation has been finalized. It has been forwarded to the University of Moratuwa and the National Gem and Jewelry Authority for a technical comment.

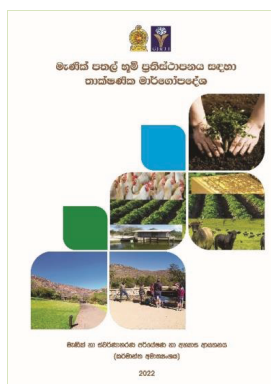


Figure 07 - Report containing technical guidelines for gem mine land restoration

6.5 Project :- Promotion of value addition to gems

6.5.1 A study on the enhancement of color and clarity of thick silky Geuda using the Lakmini air oven

The thick silky samples were separated into three parts and the flat face of each sample was prepared for chemical analysis by ED-XRF, ETIR, Raman and UV-Visible technologies. After the initial chemical analysis, the samples were heated in the Lakmini oven under reducing, oxidizing and mild oxidizing conditions. In this method, the best clarity and color were obtained by heating under mildly oxidizing conditions. Analysis of FTIR results confirmed that heat treated samples could be separated. Through the Raman spectrum, peaks of 378, 418, 578, and 751 characteristic of sapphire were observed. Analysis of UV-Visible data confirmed that the inter-ion charge transfer of (Fe, Ti)+6 complex as an effect on the blue color. No evidence was found of any special chemical change through heat treatment with ED-XRF

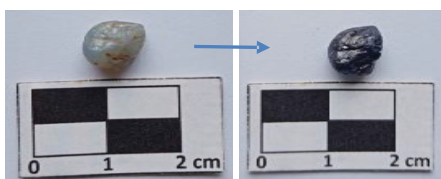


Figure 08 – Heat treatment results under oxidative conditions

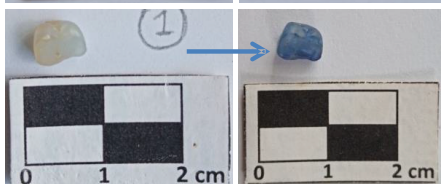


Figure 09 - Heat treatment results under oxidative conditions

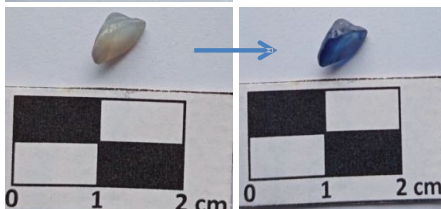


Figure 10 - Results from Heat treatment under mildly oxidizing conditions

6.5.2 Study on Enhancement of Color and Clarity of Thick Silky Geuda by Electric Furnace

Thick silky samples were cut and polished for chemical analysis and analyzed using ED-XRF, FTIR, Raman and UV-Visible technologies before and after heat treatment.

The samples were separated into three parts and heat treatment experiments were carried out by electric oven at a temperature of 1700C for 24 hours under vacuum tube condition, under normal tube condition and filled with nitrogen gas in the tube. Here, optimum color enhancement was obtained by treatment under vacuum tube conditions.



Figure 11 –Before and after heating by Thick Silky electric oven

6.5.3 Identification of a new method for Topaz treatment by electric oven

Topaz samples were cut and polished for chemical analysis and analyzed using ED-XRF, FTIR, Raman and UV-Visible technologies before and after heating. The samples were separated into two parts and the heating experiments were carried out in two ways: by continuously supplying oxygen gas into the tube for a period of twenty-four hours under a temperature of 17000C, and by filling the tube with oxygen gas only at the beginning. Here, the optimum color increase was obtained during treatment by continuously feeding oxygen gas into the tube.



Figure 12 - Before treatment



Figure 13 - Treatment results by air oven



Figure 14 - Results from the electric

6.5.4 Determination of optimum conditions for heat treatment by tanzanite electric furnace.

For tanzanite samples, a face was prepared for chemical analysis and analysis was done using ED-XRF, FTIR, Raman and UV-Visible techniques before and after heating. Treatment in vacuum tube condition under a temperature of 15500C was identified as the optimum conditions for heating by tanzanite electric furnace. Treatment in vacuum tube condition under a temperature of 15500C was identified as the optimum conditions for heating by tanzanite electric furnace.



Figure 15 - Before heating

Figure 16 - After heating

6.5.5 Identifying a new method for heating red Geuda using Lakmini air furnace

After buying the red Geuda samples, they were cleaned, cut and polished and analyzed by ED-XRF, FTIR, Raman and UV-Visible before and after heating. Lakmini Air Furnace was identified as the optimal heating conditions of 15500C for oxidation chamber treatment under atmospheric condition followed by rapid cooling.

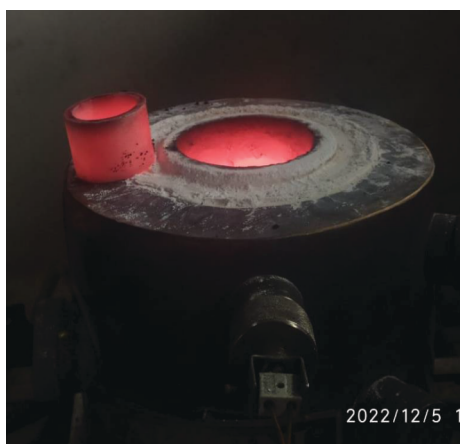


Figure 17 - Rapid cooling process

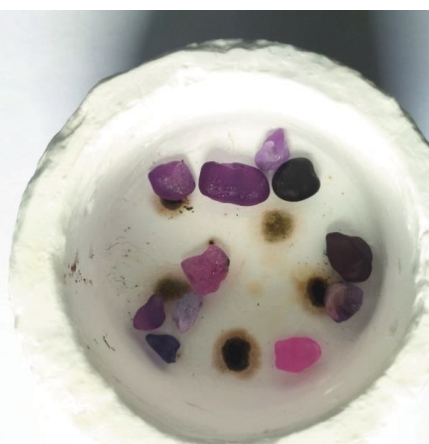


Figure 18 – Heated Red Geuda

6.6 Project :- Conducting a biochemical study on the amount of mercury that have entered into the bodies of the jewelers in Sri Lanka.

In this test, the amount of mercury in the urine samples of 84 selected jewelers in the Western Province was determined. It was identified that a higher amount of mercury is found in the body of the people who are engaged in extraction of gold using waste jewelry.



Figure 19 - Conducting a workshop for collection of urine samples from SSJS

Thus, awareness should be created among those people and about the use of substitutes for the use of mercury. Also, further studies should be done according to medical science and should be referred for medical advice.

6.7 Project :- Establishment of Laboratory Quality Management System.

Institutional laboratory accreditation has been initiated under ISO 17025:2017 Laboratory Accreditation. Here, related activities are being carried out under the guidance of Industrial Technology Institute. The entire process of laboratory quality management will be completed in 2023.

6.8 Project :- Workshops

A workshop was held at the Ratnapura center with the participation of about 66 people to provide new technical knowledge about Ruby and Sapphire heating.



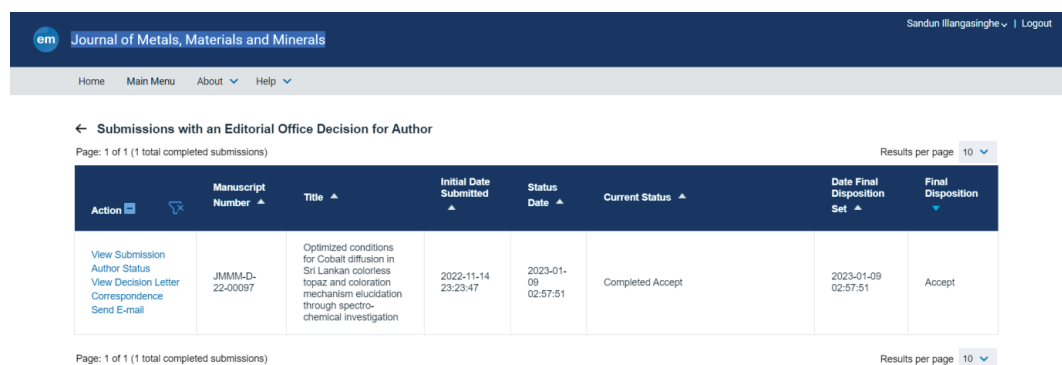
Figure 20 - Technical workshop

6.9 Project :- launching of Publications

Publication of the manuscript in SCI Journals

- 6.9.1 C. P. Udawatte, **S. Illangasinghe***, S. M. S. Abeyaweera, L. R. K. Perera, C. Weerasooriya, C. Sutthirat, **N. Jayasinghe**, T. Dharmaratne and S. Diyabalanage. Spectroscopical and Chemical Properties of Cobalt Diffused Blue Topaz, Sri Lanka. Accepted in the Journal of Metals, Materials and Minerals.
- 6.9.2 Jayasinghe, R.M.N.P.K. and Pitawala, H.M.T.G.A. 2022. Geomorphological and drainage morphometrical relationship of gem potential alluvial deposits in upper Kalu Ganga basin, Sri Lanka: A remote sensing and GIS based approach. Journal of Geological Society of Sri Lanka, 22 (2), pp. 15-26.

*Corresponding Author



The screenshot shows the 'Journal of Metals, Materials and Minerals' submission portal. The header includes the journal logo and navigation links. The main content area is titled 'Submissions with an Editorial Office Decision for Author'. It displays a table with submission details. The table has columns for Action, Manuscript Number, Title, Initial Date Submitted, Status Date, Current Status, Date Final Disposition Set, and Final Disposition. A single submission is listed with Manuscript Number JMM-M-D-22-00097, Title 'Optimized conditions for Cobalt diffusion in Sri Lankan colorless topaz and coloration mechanism elucidation through spectro-chemical investigation', Initial Date Submitted 2022-11-14 23:23:47, Status Date 2023-01-09 02:57:51, Current Status 'Completed Accept', Date Final Disposition Set 2023-01-09 02:57:51, and Final Disposition 'Accept'. The page indicates 1 of 1 total completed submissions.

Action	Manuscript Number	Title	Initial Date Submitted	Status Date	Current Status	Date Final Disposition Set	Final Disposition
View Submission Author Status View Decision Letter Correspondence Send E-mail	JMM-M-D-22-00097	Optimized conditions for Cobalt diffusion in Sri Lankan colorless topaz and coloration mechanism elucidation through spectro-chemical investigation	2022-11-14 23:23:47	2023-01-09 02:57:51	Completed Accept	2023-01-09 02:57:51	Accept

Figure 21- Notice of recognition through the journal

- 6.9.3 Rifkhan, M.N.M., Wewegedara W.G.C.N., Jayasinghe R.M.N.P.K., Dharmaratne T.S., Malaviarachchi M.A.S.P.K, Chndrajith Rohana. 2022. Reddish-Brown Zircons of Sri Lanka; A Detailed Study and Development of a New Technique for Yellow to Golden Yellow Colour Enhancement. Journal of Geological Society of Sri Lanka, 22 (2), pp. 39-45.

6.10 Publication of Books.

6.10.1 Compilation of the book titled “Sri Lankan Gem Mining Industry for a Sustainable Era” which was translated into English. This was planned to be printed in the last quarter of 2022 but due to lack of financial provision it was planned to be printed in 2023.



Figure 22
- the book, *Sri Lankan Gem Mining Industry for Sustainable Era*

6.11 Project :- Provision of technical services

6.11.1 Exploration of gem deposits on private lands

Gem deposit exploration was carried out on a private land in Taldewa village in Avissawella area.

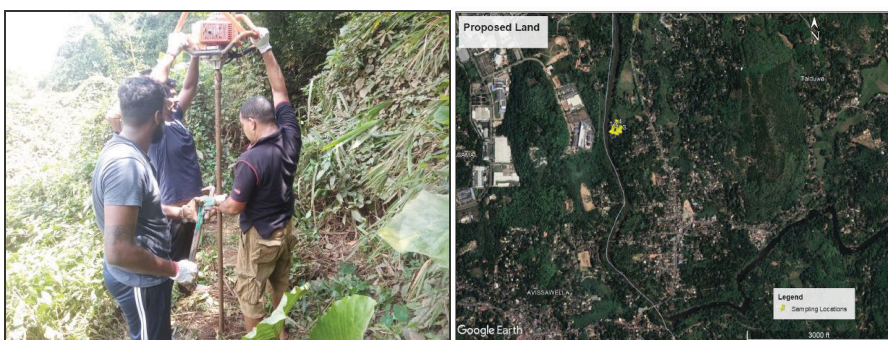


Figure 05 - Exploration

6.11.2 Heat Treatment Services

Under the provision of home heating services for outsiders, that is delivered by charging money, 13 services were provided by the Lakmini oven and 08 services by the electric oven and an income of Rs.246,000 was earned in this year.

6.11.3 High-tech Laboratory Services

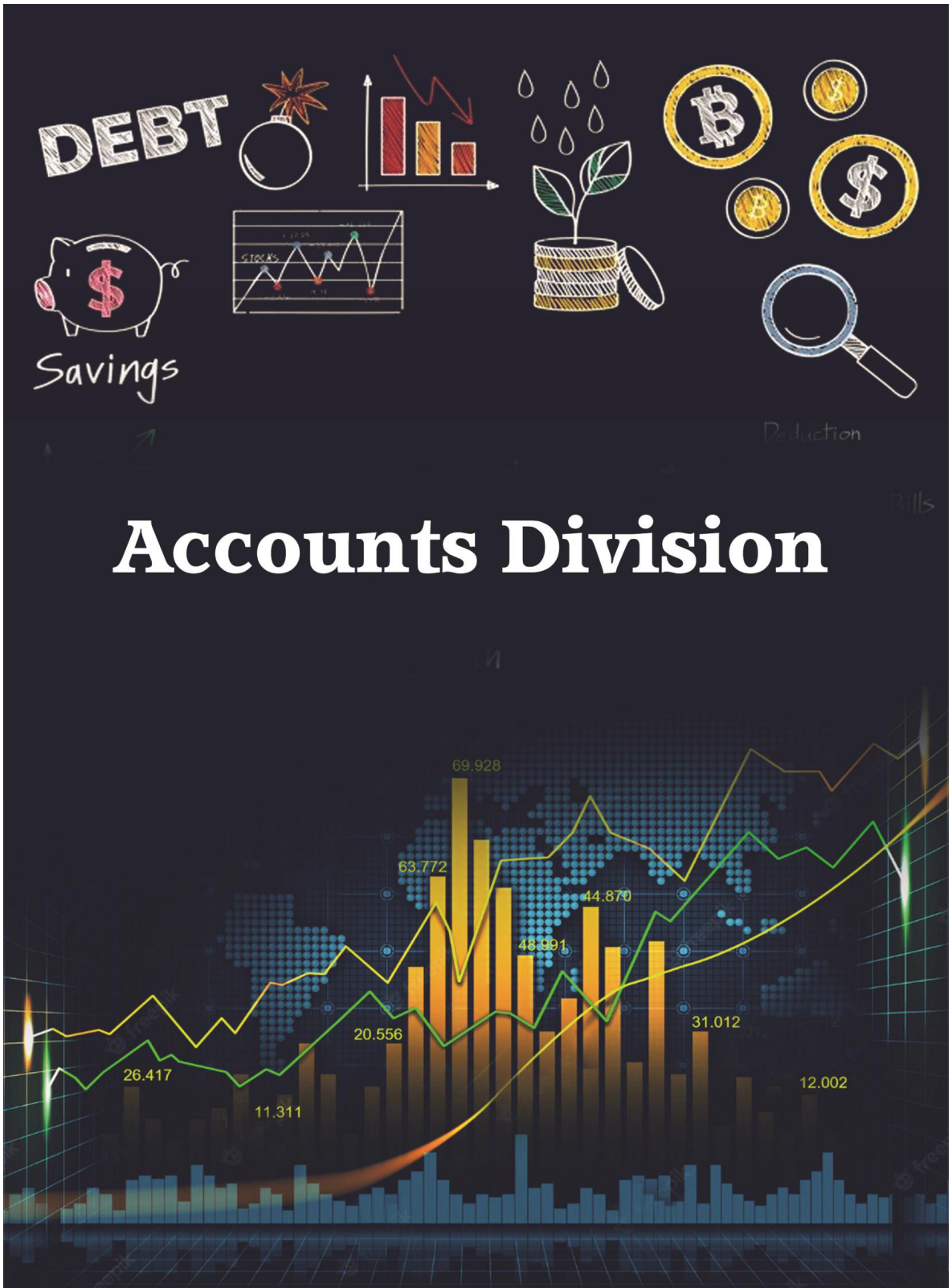
Under the provision of laboratory analysis services, the institute has earned an amount of Rs. 351,900 in the year 2022 through 42 ED-XRF analysis samples and 14 Raman analysis samples.



Administration and Human Resource Division

Employee participation in external training programs - 2022
Local training programs

#	Training Centres	Name of training program	participants
1.	Skill Development Fund (SDFL)	Two-day Workshop on Government Procurement Process	1. Mrs. Lasni Surendra (Assistant Director - Jewellery) 2. Mrs. Subhashini Konara (Training Officer) 3. Mr. Ashoka Rajaratne (Management Assistant) 4. Ms.H.M.N.N.K. Wijeratne (Audit Assistant)
2.	Skill Development Fund (SDFL)	Two-day Workshop on Transport Management	1. Mrs. Kalpani Perera (Management Assistant)



Audited financial information for the last 05 years.
(Rs..000)

	2018	2019	2020	2021	2022
Operating Revenue					
Treasury Grants recurrent	79,854.0	85,000.00	77,973.00	77,060.00	86,996.00
Other contributions	37,104.7	35,622.80	29,536.91	22,528.16	19,430.60
Course fees	10,835.1	12,212.03	12,409.64	3,542.50	15,529.05
Income From Services	76.5	308.0	72.5	12.00	246.00
Income From Geological Services					
Total Operating Revenue	127,870.3	133,142.83	119,992.05	103,142.66	122,201.65
Other Revenue	2,114.2	1,690.02	1,042.83	837.49	1,742.04
Interest income	519.4	553.42	457.21	293.71	466.03
Other receipts	25.59	60.48	4680.0	1564.0	
Total Revenue	130,529.49	135,446.75	126,172.10	105,837.39	124,409.73
Less: Expenses					
(a)Personnel and Administration expenditure	88,935.0	98,994.18	91,624.36	84,691.33	99,431.65
(b)Depreciation and General expenditure	38,806.7	41,564.02	28,208.10	33,251.66	30,297.86
Total expenses	127,741.78	140,558.20	119,832.46	117,943.00	129,729.51
Surplus (Deficit)	2,787.6	(5,111.45)	6,339.64	(12,105.1)	(5,319.78)

Gem and Jewellery Research and Training Institute
Income and Expenditure Statement for the year ending 31st December 2022

Description	2022		2021	
	Rs. 000	Rs. 000	Rs. 000	Rs. 000
Operating Income				
Recurrent grants – Treasury		86,996.00		77,060.00
Other Income				
Course fees		15,529.05		3,542.50
Geuda heat treatment service charges		246.0		12.0
Interest income		466.03		293.71
Sundry income		1,742.04		837.50
13-year continuous education programme				1,564.00
Operating Income total		104,979.13		83,309.71
Less – operating expenses				
Personnel emoluments		57,278.25		51,666.29
Travelling expenses		72.60		53.11
Supplies and consumable items		5,016.90		2,800.79
Maintenance expenses		4,568.33		2,062.29
Contractual services		28,282.47		25,743.55
Training programme expenses		3,413.72		1,908.07
Other operating expenses		774.80		443.61
Total operating expenses		99,407.07		84,677.71
Surplus / (Deficit) From Operating Activities		5,572.06		(1,368.0)
Less: Financial Cost		(24.57)		(13.62)
Grants- Capital Expenditure Portion	16,876.10		17,917.47	
Other Receipts				
Less: Depreciation and Amortization Expenses	16,876.10		17,917.47	
	(27,743.37)	(10,867.27)	(28,640.97)	(10,723.50)
Other Capital Investment Grants				
Less: Capital Investment Expenditure Improvements of Capital Assets	(2554.50)		4610.61	
NET Expenditure on Other Capital Investment	(2554.50)		(3935.71)	
			(674.90)	
Non-Operating Revenue		(5319.78)		(12,105.12)
Add: Gain on Sales of Assets				
Net Surplus (Deficit) Before Extra-Ordinary Items		(5319.78)		(12,105.12)
Extra Ordinary Items				
Net Surplus / (deficit) for the period		(5319.78)		(12,105.12)
Add:				
Net Surplus / (Deficit) from previous years	(39,308.94)		(31,479.11)	
Less: Prior year Adj.		(2930.13)		4275.30
Net Surplus / (Deficit) C/F		(47,558.85)		(39,308.93)

Gem and Jewelry Research and Training Institute

Balance Sheet as at 31.12.2022

Description	2022		2021	
	Rs. 000	Rs. 000	Rs. 000	Rs. 000
<u>Non-Current Assets</u>				
Property, Plant & Equipment	101,259		129,378	
Gratuity Fund	955	102,214	2272	131,650
Fixed deposit account		4304		3980
<u>Current Assets</u>				
Stock & Consumables	4798		3798	
Books for Sale				
Loan and Advances	3362		1847	
Deposits	630		610	
Trade & Other receivables	7483		8429	
Poverty elimination project	1559		3577	
Prepayments	202		125	
Cash and bank	9114	27,148	8793	27,179
Total Assets		133,666		162,809
<u>Liabilities</u>				
<u>Current liabilities</u>				
Payables	604		599	
Accrued expenses	4336	4,940	6727	7,326
<u>Non-current liabilities</u>				
Minimata project	179		570	
Provisions for Gratuity	13350		14172	
National Science foundation		13,529		14,742
Total liabilities		18,469		22,068
Net total assets		115,197		140,741
<u>Net Assets/Equity</u>				
Contributed Capital	50000		50000	
Reserves – Gem	43772		43772	
Other contributions	850		850	
Staff Circulating Fund (Loan)	1857		1721	
Differed Income –Capital Grants	66276		83706	
Accumulated Fund	(47,558)		(39,308)	
Total Net Assets/Equity		115,197		140,741



Assistant Director (Finance)

09-05-2023

Date:



Chairman

Date : 09-05-2023



Member of the Board of Directors

Date: 09-05-2023

Gem and Jewellery Research and Training Institute

Cash Flow Statement for the year ending 31st December 2022

(Rs.000)

Description	2022	2021
Cash Flows From Operating Activities		
Surplus/(Deficit) from Operating Activities	(5,319.78)	(12,105.12)
Non Cash Movements		
Depreciation	27,743.37	28,640.97
Interest	(466.03)	(293.71)
Differed Capital income adjustments	(19,430.61)	(22,528.16)
Increase/decrease in other Non-current Liabilities	(2,126.89)	610.55
Income from sale of property, plant and equipment	(13.66)	
Lease rent	473.48	473.48
Provision for gratuity	2,939.77	479.25
Capital assets adjustments	(8.82)	(41,660.52)
Gratuity payments	(3,761.43)	(2,134.27)
Increase in other current assets	(1,331.63)	2,866.50
Gratuity payables		
Reserves		41,660.52
Net Cash Flow from Operating Activities (A)	(1,302.23)	(3,990.53)
Cash Flow from Investment Activities		
Purchase of Property Plant and Equipment	(89.65)	(3,136.4)
Increase in Gratuity Fund	1,316.79	(1,000.7)
Interest income	602.45	450.37
Increase/ decrease in fixed deposits	(324.42)	1,932.2
Profit on property plant and equipment	13.66	
Distress loan payments	(2,743.05)	(1,364.44)
distress loan receipts	1,238.72	1,827.31
Net Cash Flow from Investment Activities (B)	14.51	(1,291.57)
Cash Flow from Financing Activities		
Capital grants	2,000.0	5,024.0
Minimata project	(391.82)	300.4
National Science Foundation fund		(1,310.4)
Net Cash Flow from Financing Activities (c)	1,608.18	4,013.95
Net Increase /(Decrease) in Cash and Cash Equivalents (a)+(b)+(c)	320.46	(1,268.15)
cash/financial balance at the beginning of year	8,793.22	10,061.37
Cash/financial balance at the end of year	9,113.68	8,793.22

Chairman,
Gem and Jewellery Research and Training Institute

Auditor General's Report of the Gem and Jewellery Research and Training Institute in accordance with Section 12 of the National Audit Act No. 19 of 2018 on Financial Statements and Other Legal and Regulatory Requirements for the year ending as at 31st December 2022.

1. Financial Statements

1.1 Qualified Opinion

Financial Statement of Gem and Jewellery Research and Training Institute for the financial year, ending on 31st December 2022 and Statement of Comprehensive Income ending for the same year, Statement of Changes in Equity and Statement of Cash Flow, notes relevant to Financial Statements, Summarized Important Accounting Policies of Gem and Jewellery Research and Training Institute for the financial year, ending on 31st December 2022 were audited under my guidance in accordance with the provisions of the National Audit Act No. 19 of 2018, which should be read with the provisions of Article 154 (1) of the Constitution of the Democratic Socialist Republic of Sri Lanka, and the Finance Act No. 38 of 1971. My Report shall be tabled in Parliament in due course in accordance with the provisions of Article 154 (6) of the Constitution.

I am of the opinion that the financial statements of the Institute reflect a true and fair view of the financial position as at 31 December 2022 and its financial performance and cash flows for the year ending on that date in accordance with Sri Lanka Public Sector Accounting Standards.

1.2 Basis for Qualified Opinion

- (a) Although fully depreciated at the end of the year under review, the assets still in use whose cost value is Rs.53,558,228 was not disclosed in the financial statements. As well, according to Sri Lanka Public Sector Accounting Standard 03, the effective life of these assets had not been rereviewed and adjusted in the financial statements.
- (b) The number of gemstones valued at Rs 2,301,575 included in property, plant and equipment had not been recalculated for over four years.
- (c) According to the bank statement, Rs.1,635,470 had been directly deposited in the bank as of December 31, 2022, and the value of Rs.319,710 that was directly deposited in the bank in 2020 and 2021 was included in this balance. These direct deposits had not been identified and revealed in the financial statements.

The audit was conducted by me as per the Sri Lanka Auditing Standards(SLAS). My responsibility under the Auditing Standards has been further described in this report under the caption of the auditor's responsibility of auditing financial statements. I am confident that the audit evidences that I have obtained are sufficient and appropriate to provide a basis for my opinion.

1.3 Other Information of the Institute Included in the Annual Report 2022

Other information means information included in the 2022 annual report of the institution obtained by me prior to this audit report but not included in the financial statements and my audit report. Management is responsible for this other information.

Other information is not covered in my opinion regarding financial statements and I do not express any kind of assurance or opinion on that.

With regard to my audit of financial statements, it is my responsibility to read the other information identified above and to consider whether other information is quantitatively compatible with the financial statements according to the audit or to the best of my knowledge obtained in another way.

If I decide that other information is quantitatively incorrect based on the information received prior to the date of this audit report and the measures completed, I need to report that fact. I have nothing to report in this regard.

1.4 Responsibility of the Management and the Administration on Financial Statements

Preparation of these financial statements according to Sri Lanka Public Sector Accounting Standards and fairly submission, and determination of the internal controls required to be able to prepare financial statements without material misstatement due to fraud or errors is the responsibility of the management.

It is the responsibility of management to determine the continuous existence of the organization in the preparation of financial statements. If not management decides to liquidate or cease the operation of the organization when there is no other option, it is the responsibility of the management to keep accounts on the basis of the continuity of the organization and to disclose the facts relevant to the continued existence of the organization.

Responsibility of the inspection of the financial reporting process of the institute will be borne by the administration.

Books and records of all its Income, Expenditure, Assets and Liabilities should be properly maintained so as to be able to prepare the annual and periodic Financial Statements of the Institution in terms of Sub-Section 16 (1) of the National Audit Act No. 19 of 2018.

1.5 Auditor's Responsibilities for the Audit of the Financial Statements

My purpose as a whole is to provide a fair confirmation on financial statements that there are no material misstatements caused by frauds and errors and to issue the Auditor's Report, which includes my opinion. Fair certification is a high level of certification, but

auditing in accordance with Sri Lanka Auditing Standards does not always guarantee that it will detect a material misstatement. Frauds and errors can result in material misstatements due to an individual or collective influence, and its adequacy depends on the impact on the economic decisions made by users based on these financial statements.

As a part of the audit in accordance with Sri Lanka Auditing Standards, I conducted the audit with professional judgment and professional skepticism. Further,

- Appropriate audit procedures were designed and implemented from time to time to identify and assess the risk of material misstatement in financial statements due to fraud or error in providing a basis for my stated opinion. The effects of fraud are higher than the effects of material misstatement, as fraud may involve collusion, forgery, intentional omissions, or the override of internal control.
- An understanding of the internal control of the organization gained in order to plan appropriate audit procedures, but it did not intend to express an opinion on the effectiveness of the internal control of the institute,
- Disclosures related to the appropriateness of the accounting policies pursued by management and the fairness of the accounting estimates were evaluated.
- The relevance of using the basis of the institution's continuous existence for accounting was determined based on the audit evidence obtained as to whether there was a material uncertainty about the continuity of the institute due to events or conditions. If I conclude that there is sufficient uncertainty, attention should be paid to the disclosures that were made in the financial statements in my audit report, and if that disclosure is not sufficient, my opinion should be modified. However, continuous existence may end based on future events or conditions.

- Appropriate and reasonable inclusion of transactions and events, based on the structure and content of financial statements, and the overall presentation of the financial statements, were valued.

I make aware of the administration regarding the important audit findings identified during my audit, internal controlling weaknesses, and other matters.

2. Report of other legal and supervisory requirements

- 2.1 Special provisions regarding the following requirements are included in the National Audit Act No.19 of 2018.
 - 2,1,1 Except for the effect of the matters described in the Basis for Qualified Opinion section of my report, as per the requirements of section 12(a) of the National Audit Act No. 19 of 2018, all relevant information and explanations for the audit have been obtained by me and, according to my opinion, the auditee-entity had maintained financial reports rationally.
 - 2.1.2 As per the requirements of section 6 (I) (d)(III) of the National Audit Act No. 19 of 2018, financial statements presented for audit are consistent with the previous year.
 - 2.1.3 As per the requirements of section 6 (I) (d)(IV) of the National Audit Act No. 19 of 2018, recommendations made by the Auditor-General in the previous year had been included in the submitted financial statements.
- 2,2 Restricting to the action taken, received evidence and obtained quantitative facts, none of the following statements came to my notice.
 - 2.2.1 In accordance with the requirements of Section 12 (d) of the National Audit Act No. 19 of 2018, any member of the Board of Directors of that Institution shall have a direct or indirect involvement in any contract relating to that Institution in a manner other than the normal business condition.

- 2.2.2 In accordance with the requirements of Section 12 (f) of the National Audit Act No. 19 of 2018, the auditee entity has not acted in accordance with the applicable written law or the general or special instructions issued by the board of directors of the institution.
- 2.2.3 In accordance with the requirements of Section 12 (g) of the National Audit Act No. 19 of 2018, the auditee entity has not performed according to its powers, functions, and duties.
- 2.2.4 In accordance with the requirements of Section 12 (h) of the National Audit Act No. 19 of 2018, the resources of the auditee entity had not been procured and utilized economically, efficiently and effectively within the time frames in compliance with the applicable laws.

2.3. Other Matters

- (a) The accounting software system, purchased for Rs 346,035 in 2017 for the accounting purposes of the institution, has not been used for six years to maintain accounts, due to its deficiencies. There was also no service agreement related to the updates and maintenance to be done while using this software.
- (b) The land which was acquired on a 30-year lease basis at a cost of Rs 14,204,402 in 2016 for the construction of the Rathnapura district office, had been underutilized for more than 06 years due to non-performance of relevant until the present year.
- (c) In the overpaid salary balance, there was an amount of Rs 466,762 which should have been collected from 04 officers in instalments but not collected.
- (d) The approved cadre of the institution was 136 and the actual staff on 31.12.2022 was 65. 71 posts were vacant and it was 52% per cent of the approved cadre. Senior-level posts

like Director General and Director (Research) are available among these vacancies. As well, the existence of 24 out of 29 approved positions for research and 19 out of 33 approved for training as vacant posts adversely affected to conduct of research and training activities of the institution.

W.P.C. Wickramrathna

Auditor General

