BITRI

BOTSWANA INSTITUTE FOR TECHNOLOGY RESEARCH AND INNOVATION

2019/2020 annual report

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Message From The Board Chair

Prof. Sesae F. Mpuchane
Board Chairperson

I am honoured to present to you the BITRI 2019-2020 annual report. This report gives an overview of the achievements and challenges we encountered as we attempted to reach the milestones we had set for ourselves during the reporting period. In 2019, in our quest to stay relevant in the rapidly changing world, we undertook a mid-term review of our 2015-2021 Strategy. All employees were taken on board in this exercise to ensure that we come up with an inclusive document that everyone at BITRI would own.

The final product which was approved by the Board will be implemented in the remaining two years of the strategic period. It is a bold and ambitious strategy, focusing on fostering social transformation and economic competitiveness, through research, innovation and product development. This is in line with national aspirations of transforming Botswana into a knowledge based and innovation led economy which are outlined in Vision 2036 and the National Development Plan (NDP 11).

We are proud to say that during the reporting period, as per our strategic intent and objective, of 'Number of High Impact Solutions Created' , we had set a target to generate 5% of our own revenue through both Research and Development and other activities. I am pleased to say we met and surpassed the target as we were able to raise 5.5% of our revenue. This indicates that we are heading in the right direction as we do not solely want to depend on the Government subvention in these challenging times where economies across the world are struggling.

In yet another milestone, in line with our constitution, we successfully incorporated BITRI Investment (Pty) Ltd as a BITRI subsidiary company to oversee the commercialization of all our invented technologies through various pathways ranging from spin-offs, licensing and assignments. The subsidiary will also manage Contract Research and Consultancy Services provided by BITRI. We at BITRI see this as a milestone worth celebrating as it will enhance the adoption of the technologies that we develop, hence allowing us to live our vision of being the leading technology solutions provider that transforms lives thus impacting the lives of our people positively.

Message From The Board Chair

We are now, also part of the Technology and Innovation Support (TISC) network which is made up of several academic and Research and Development Institutions in Botswana. The TISC network is a World Intellectual Property Organization (WIPO) supported project meant to spur creativity and innovation by bridging the knowledge gap between developing and developed countries. The launch of TISC in Botswana is a welcome and important milestone as it is expected to play a major role towards the identification and adaptation of pre-existing technologies to meet the needs of the people of Botswana.

In conclusion I invite you to read this report and give us feedback on how we can serve you better. I would also like to thank the Government of Botswana for their unwavering support.

Thank you.

Prof. Sesae F. Mpuchane

Chairperson, Board of Directors

Message From The CEO

Prof. Shedden Masupe
Chief Executive Officer

I am pleased to present to you the Botswana Institute For Technology Research and Innovation 2019-2020 annual report. As an organisation we continued to execute our mandate as per the strategic objectives we had set for ourselves. We did encounter some challenges but I can assure you that we took them in our stride to deliver what we set out to do. By the end of the reporting period, BITRI had a staff complement of 168 employees. All vacant positions were advertised internally and externally.

The challenge was the recruitment of some research positions especially at Researcher and Senior Researcher levels, due to non-availability of qualified applicants in the relevant specialized areas. We also continued to monitor Corporate performance on a quarterly basis to ensure that we are on track. During the reporting period, organisational performance stood at 72%.

In terms of research, our portfolio has been showing steady progress in all the six research areas. During the 2019/2020 financial year some research and development projects completed were Nthusa Mobile Application and the Climate Variability and Change Risks and Management Project (Development of Decision Support Systems for Dryland Small Scale Arable Farmers). The Nthusa Mobile application, which sends a distress text message from a person in distress attached with the geographical location of the sender, mobile cell number and their names, had completed its pilot testing with Emergency Assist 911 in Gaborone by the end of the reporting period. The testing was mainly on the Nthusa Software and the Responders Application. Negotiations for commercial adoption had begun and Emergency Assist 911 has shown interest in procuring the Application through Software as a Service model. The Climate Smart Agriculture; Lessons Learnt Manual has been developed and shared with all relevant stakeholders. The Manual is a field guide for implementing Climate Smart Agriculture under smallholder arable farming systems. We also continued with the development of the nanofiber membranes in partnership with Greenline Technologies in South Africa to make dust masks using our nanofibers to make about 1 000 flat masks.

These masks were subjected to the complete certification tests for an FFP2 at a South African Bureau of Standards accredited laboratory and passed all the tests. The masks were also tested at Nelson Labs in the United States of America for viral filtration and were found to exhibit viral filtration efficiency of 99.6% to 99.9%.

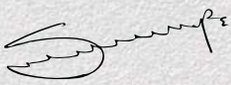
Message From The CEO

It was on the strength of this viral filtration efficiency data that we donated 500 of these masks to the Ministry of Health and Wellness at the onset of the Covid-19 pandemic. We are pursuing avenues to commercialize the production of this highly efficient filter material. To ensure that the technologies we develop are protected and adopted BITRI has an institutional Intellectual Property Policy and the Innovation Management framework through which it commercialises its technologies. It is in this regard that BITRI licensed out one technology this reporting period, the online wildlife tracking App (Kwibi) to Foxcroft. This brings the total number of technologies licensed out to two.

Guided by our institutional Intellectual Property Policy, we managed to accumulate a few Intellectual Property Rights since inception. By the end of the reporting period the intellectual property rights portfolio of BITRI stood at one patent, five trademarks, one industrial design and several copyright works in the form of computer programs authored by the Information Systems Technologies Unit. To ensure that the excellent technologies are communicated and marketed we continued to engage our stakeholders through exhibitions, seminars, briefs and workshops. It is imperative that we get feedback from our stakeholders so that we stay relevant and true to our philosophy of "Technology From You to Us For You".

I call upon you, our valued stakeholder, to please feel free to interrogate this report and engage us if need be so that together we achieve Vision 2036 Prosperity for all through research and development.

In conclusion let me thank the BITRI Board of Directors for their guidance in all corporate matters and the BITRI staff for their dedication and hard work in ensuring that we achieve what we set out to do for the year. Thank you.



Prof Shedden Masupe
PhD, SMIEEE, Pr.Eng
Chief Executive Officer

About BITRI

The Botswana Institute for Technology Research and Innovation (BITRI) is a parastatal under the Ministry of Tertiary Education Research Science and Technology, established as a Company Limited by Guarantee in 2012, to conduct needs-based research and development in focused areas.

The Mandate of BITRI is to identify, develop and/or adapt appropriate technology solutions that provides sustainable innovative solutions through co-creation and collaboration in line with national priorities and needs of Batswana.

BITRI will develop technologies that will as much as possible maximize the use of local materials to ensure efficiency and affordability.

BITRI will harness its institutional capacity as well as collaborate with other organizations and institutions.

BITRI is situated at Maranyane House in Gaborone, Botswana. It has other campuses in Gaborone, Kanye and Palapye.

BITRI has five Departments namely,

> Technologies;
> Natural Resources and Materials;
> Research & Partnerships;
> Human Capital
> Finance and Operations.

About BITRI

Mission

To conduct needs-based technology research that provides sustainable innovative solutions through co-creation and collaboration with local and international stakeholders

Vision

To be the leading technology solutions provider that transforms lives.

Values

Teamwork
Excellence
Empathy

BITRI Strategic Intent

#1640 - At BITRI we are focused on three strategic priorities to be achieved by 2020.

1 We are focused on developing One Team/ Mission/Goal

6 We will deliver on six technologies

40 We will generate Forty percent of our own revenue

BITRI THEMATIC RESEARCH AREAS

Natural Resources and Materials

- Building Materials
- Climate Change
- Nanomaterials

Technologies

- Electronics and Communications
- Energy
- Information Systems Technologies

BOARD OF DIRECTORS

The Board of Directors of BITRI is committed to ensuring high standards of corporate governance. The Board of Directors is at the apex of the governance structure of BITRI. The Board oversees and guides BITRI's general strategic direction and policy formulation in accordance with the BITRI Constitution and the Companies Act of Botswana. The Board is ultimately accountable to the shareholder being the Government of Botswana for all the affairs of BITRI.

BOARD DOCUMENTATION	
BITRI CONSTITUTION	• Overarching governing document for BITRI • Sets out the mandate and objectives of BITRI
SHAREHOLDER COMPACT	• Sets out expectations of the Government of Botswana as the shareholder of BITRI and the BITRI Board of Directors
BOARD AND COMMITTEE CHARTERS	• Outlines the roles and responsibilities of the Directors collectively and individually

REGULATORY COMPLIANCE

BITRI is a company limited by guarantee and incorporated in terms of the Companies Act of Botswana. As a result, BITRI is under a legal obligation to comply with all statutory requirements set out in the Companies Act. In that regard, BITRI has been duly re-registered under the Companies Act within the set timelines. In addition, the annual return and the audited annual financial statements for BITRI for the period under review have been filed with the Companies and Intellectual Property Authority. For the period under review, BITRI complied with all legal requirements emanating from the Companies Act.

Corporate Governance

BOARD OF DIRECTORS

The composition of the BITRI Board is regulated by the BITRI Constitution. The Minister of Tertiary Education, Research, Science and Technology is responsible for the appointment of Directors. The Minister appoints persons he considers qualified by reason of their experience and knowledge in research, science, technology and innovation issues. The Board of BITRI is allowed to have not more than ten (10) Directors including the Executive Director being the Chief Executive Officer. Directors can be appointed for an initial term of three (3) years. On completion of their first term, Directors are eligible for re-appointment for a further period of two (2) years. The Chairperson of the Board is appointed by the Minister while the Vice Chairperson is appointed by the Directors amongst themselves.

Corporate Governance

Prof. Sesae F. Mpuchane
Board Chairperson

Dr. Ontiretse Madisa Mine
Deputy Chairperson

Dr. Sebusi Odisitse
Member

Dr. Poloko Kebaabetswe
Member

Dr. Ronald Tshelametse
Member

Dr. Force Thema
Member

Ms. Lesego M. Thamae
Member

Mr. Baitshepi Tebogo
Member

Mr. Oganeditse Marata
Member

Prof. Shedden Masupe
Chief Executive Officer

Corporate Governance

CONFLICT OF INTEREST

The Board continues to maintain annual registers of Directors' interests as part of efforts of effectively managing potential conflicts of interest. In addition, Directors are required to disclose real, potential or apparent conflict of interest in relation to the business being considered at every meeting of the Board and its Committees. Disclosures of any interest are recorded in minutes of the meeting.

BOARD TRAINING

In line with the values of continuous learning, all BITRI Board Members are Members of the Institute of Directors Southern Africa. The platform gives the Directors access to governance articles and documentation on various subject matters and also provides networking opportunities.

The Board annually approves a training plan for Board Members geared at ensuring that Board Members have the requisite diversity of expertise and experience necessary for the stewardship and provision of strategic guidance to BITRI.

BOARD MEETINGS

The BITRI Constitution requires the Board to meet at least quarterly to consider the business of BITRI. A notice of the schedule of Board and Committee meetings for the period under review was shared with all Directors at the beginning of the period under review in order to ensure maximum attendance by the Directors. Where the business of BITRI dictates, special meetings are convened to dispense with urgent matters to avoid undue delays.

Specific topics discussed at quarterly Board meetings include overall strategy, annual budgets, management accounts and annual financial statements and the approval of policies. All Board members have access to the advice and services of the Board Secretary.

In terms of the Board Charter, where necessary Directors are allowed to seek independent professional advice at the expense of BITRI provided that prior authorisation is obtained through the set channels.

DELEGATION OF AUTHORITY

The BITRI Constitution allows for the Board of Directors to delegate some of its powers, functions or duties to its Committees. Provision is also made for non-board members to be appointed to the Committees in order to augment the skill base of the Committees. In that regard, the Board, through the assistance of the Public Enterprise Evaluation and Procurement Agency, co-opted two experts into the Finance Risk and Audit Committee and the Human Resources Committee. Notwithstanding the delegation, the Board however remains accountable for the exercise of its delegated authority. For the period under review, the Board delegated its authority to the following Committees:

Corporate Governance

1. QUALITY AND TECHNOLOGY COMMITTEE

The Quality and Technology Committee is a technical Committee of the Board set up to provide guidance and advice on the development, execution and transfer of Research and Development programmes and outcomes.

The duties of the Quality and Technology Committee include but are not limited to the following: advising and guiding the organisation on Research and Development policies and strategy; resolving issues related to Research and Development which cannot be addressed at Management and /or Operational levels, and make recommendations as required; reviewing and approving programme/project proposals for Research and Development as well as options for technology transfer; and monitoring overall progress and impact of Research and Development programmes.

2. FINANCE, AUDIT AND RISK COMMITTEE

The Finance, Audit and Risk Committee is responsible for reviewing and providing guidance in respect of the policies and practices that relate to the management of the BITRI financial affairs. It is also responsible for the monitoring and oversight of the internal controls and risk management systems.

The Committee's duties are as follows: annually review the organization's financial policies and regulations in view of maintaining and improving its financial health; reviewing and recommending to the Board a long-term financial plan and annual operating/capital budgets consistent with the policies and strategies of the company; oversee the management of organization-wide financial assets, including prudent financial and risk management; monitor the independence and effectiveness of the internal audit function and review and evaluate the effectiveness of the organisation's internal control system; annually meet with external auditors to discuss the results of the audit and any required changes to the financial statements, accounting principles and disclosure practices.

3. HUMAN RESOURCE COMMITTEE

The Human Resource Committee assists the Board in ensuring that BITRI has the appropriate human resources policies, practices and procedures in line with its human resources goals and strategic objectives, with a view of attracting, retaining, motivating and developing key skills for the organization.
Duties of the Committee include the following: monitoring, evaluating and making decisions on behalf of the Board with respect to human resources policies and strategic matters for recruiting, developing and motivating BITRI employees; reviewing and approving human capital development policies and strategies to attract specific research, science and technology capacity and skills; monitoring the leadership and management development plans of BITRI as well as ensuring that there is succession planning; and periodically reviewing BITRI's recruitment, development, promotion and retention programmes, workforce composition and the appropriateness of current and future organisational structure.

Corporate Governance

4. BOARD TENDER COMMITTEE

The Board Tender Committee is set up to adjudicate on issues of procurement as well as disposal of assets. It deals with procurements for values above P1 Million but not exceeding P3 Million. In terms of the BITRI Tender and Procurement Regulations, the Management Procurement Committee deals with procurements for values less than P1 Million while the Board deals with values exceeding P3 Million.

The responsibilities of the Committee include amongst others the following: adjudication, authorisation or recommendation to the Board the award of tenders for requirements of supplies, works and services in accordance with the BITRI Procurement and Tender Regulations; ensuring that adequate budgetary provisions exist for proposed procurements; approval of the BITRI annual procurement plans; and recommendation of the disposal of any BITRI land or buildings to the Board.

Register of Attendance of Board Meetings For The Financial Year 2019/2020

BOARD MEMBER	09/05/19	03/07/19	08/08/19	20/09/19	10/11/19	27/02/20	23/03/20
Prof. S. Mpuchane - Chairperson	Present	Present	Present	Present	Present	Present	Present
Dr. Ontiretse Madisa Mine Vice Chairperson	Apology	Present	Present	Apology	Present	Apology	Apology
Dr. Ronald Tshelametse - Director	Present	Present	Present	Present	Present	Present	Present
Mr. Baitshepi Tebogo - Director	Present	Apology	Present	Present	Apology	Present	Apology
Mr. Oganeditse Marata - Director	Present	Present	Apology	Apology	Present	Present	Present
Dr. Poloko Kebaabetswe - Director	Present	Present	Present	Present	Present	Present	Present
Ms. Lesego Thamae - Director	Apology	Present	Present	Apology	Present	Present	Present
Dr. Sebusi Odisitse -Director	Present	Present	Present	Present	Present	Present	Present
Dr. Force Thema - Director	Present	Present	Present	Present	Present	Present	Present
Prof. Shedden Masupe - CEO	Apology	Present	Present	Apology	Present	Present	Present

1. Quality and Technology Committee

COMMITTEE MEMBER	15/04/19	22/07/19	16/08/19	28/10/19	07/02/20
Dr. Ronald Tshelametse (Committee Chairperson)	Apology	Present	Present	Present	Present
Dr. Ontiretse Madisa Mine	Present	Apology	Apology	Present	Apology
Dr. Poloko Kebaabetswe	Present	Present	Present	Present	Present
Dr. Sebusi Odisitse	Present	Present	Present	Present	Present
Ms. Lesego M. Thamae	Present	Present	Present	Present	Apology
Dr. Force Thema	Present	Apology	Apology	Present	Present
Prof. Shedden Masupe	Apology	Present	Present	Present	Present

Corporate Governance

2. Board Tender Committee

COMMITTEE MEMBER	24/04/19	23/07/19	29/10/19	04/02/20
Mr. Oganeditse Marata (Committee Chairperson)	Present	Present	Present	Apology
Mr. Baitshepi Tebogo	Present	Present	Apology	Present
Dr. Force Thema	Present	Apology	Present	Present
Dr. Sebusi Odisitse	Present	Present	Present	Present
Prof. Shedden Masupe	Present	Present	Present	Present

3. Finance, Audit and Risk Committee

COMMITTEE MEMBER	02/05/19	25/07/19	31/10/19	06/02/20
Mr. Baitshepi Tebogo (Committee Chairperson)	Present	Present	Present	Present
Dr. Ontiretse Madisa Mine	Apology	Present	Present	Apology
Dr. Ronald Tshelametse	Present	Present	Present	Present
Mr. Kagiso Balopi (co-opted Member)	Present	Present	Apology	Present
Prof. Shedden Masupe	Present	Present	Present	Present

4. Human Resource Committee

COMMITTEE MEMBER	15/04/19	13/06/19	22/07/19	15/08/19	13/09/19	28/10/19	03/02/19
Dr. Poloko Kebaabetswe (Committee Chairperson)	Present	Present	Present	Present	Present	Present	Present
Ms. Lesego Thamae	Present	Apology	Present	Present	Apology	Present	Apology
Mr. Oganeditse Marata	Present	Present	Present	Present	Present	Apology	Present
Mr. David-George Moloi (co-opted Member)	Present	Present	Present	Present	Present	Present	Present
Prof. Shedden Masupe	Apology	Present	Present	Present	Apology	Present	Present

Remuneration of Directors

The BITRI Constitution provides for the payment of a sitting allowance for Directors. It also provides for the payment of travel, hotel and other expenses of the Directors incurred in attending and returning from meetings of the Board or any Committee of the Board, general meetings of BITRI or in connection with the business of BITRI. The payments are done in accordance with the applicable Government regulations and standards as well as prescribed sitting allowance rates. The sitting allowances paid during the year under review were P1 575.00 for the Chairperson and P1 260.00 for other Directors.

STRATEGY

During the reporting period BITRI conducted its mid-term strategy review to take into cognizance the changes within the political, social, economic and technological environments within which BITRI exists since the formation of its first strategy in 2015. An all-inclusive process of discussions with all employees at BITRI was undertaken. The revised plan which was presented to and approved by the Board will be implemented in the remaining two years of the strategic period, from 2019 up to 2021 setting out a bold and ambitious vision for BITRI in fostering social transformation and economic competitiveness, through Research, Innovation and Product Development.

This is in line with national aspirations outlined in Vision 2036 and the National Development Plan (NDP 11) of transforming Botswana into a knowledge based and innovation led economy. As a result, a set of clear and defined objectives which will drive BITRI towards the realization of that vision were developed.

Policies Communication Workshops: Since August 2019, an exercise to sensitizing employees on all BITRI Policies was undertaken. The main purpose of these awareness workshops was to equip employees with knowledge and appreciation of how these policies work so that there could be improved consistency in their applications. The policies covered were from Human Capital, Finance and Operations, Research and Partnerships and IT Policies.

Strategy

The table below show progress attained on the strategic intent for the 2019/20 financial year.

Progress Achieved

	'CULTURE / TEAM ' RELATED INITIATIVES			NUMBER OF HIGH IMPACT SOLUTIONS CREATED			% OF FUNDS GENERATED		
2019/20	Target	Actual	% Achieved	Target	Actual	% Achieved	Target	Actual	% Achieved
	1	1	100%	2	2	100%	25%	9.3%	37%

MID TERM STRATEGY REVIEW:
During the year, BITRI conducted its mid- term strategy review to take into cognizance the changes within the political, social, economic and technological environments within which BITRI exists since the formation of its first strategy in 2015. An all-inclusive process of discussions with all employees at BITRI was undertaken. The revised plan which was presented to and approved by the Board will be implemented in the remaining two years of the strategic period, from 2019 up to 2021 setting out a bold and ambitious vision for BITRI in fostering social transformation and economic competitiveness, through **Research, Innovation and Product Development.** This is in line with national aspirations outlined in Vision 2036 and National Development Plan (NDP 11) of transforming Botswana into a knowledge based and innovation led economy. As a result, a set of clear and defined objectives which will drive BITRI towards the realization of that vision were developed.

BITRI POLICIES COMMUNICATION WORKSHOPS:
Since August 2019, an exercise of sensitizing employees on all BITRI Policies was undertaken. The main purpose of these awareness workshops was to equip employees with knowledge and appreciation of how these policies work so that there could be improved consistency in their applications. The policies covered were from Human Capital, Finance and Operations, Research and Partnerships and IT Policies.

1. The online wildlife tracking App (Kwibi-formerly iNtsu) license agreement was signed by BITRI and Foxcroft.

2. THE CLIMATE SMART AGRICULTURE;
Lessons Learnt Manual was developed as a result of a climate variability and change risks management project undertaken at the Barolong and Kgalagadi South Sub District. This project was done in collaboration with the Ministry of Agriculture and Food Security.

3. MMUALEBE CUSTOMER FEEDBACK APPLICATION: is being piloted at all BAMB branches.

During the midterm strategy review, it was agreed that this measure be split into two, income generated through non-R&D and income generated through R&D Products. The target of the year for income generated through non-R&D has been met. (5.5% has been achieved against a target of 5%)

COMMERCIALIZATION OF R&D PRODUCTS:
P3,392,882.00 was realized from the sales of Seding Lights this year. This is 3.8% achievement against the annual target of 20%.

Strategy

Annual Corporate Performance

BITRI continued to monitor corporate performance on a quarterly and annual basis. During the 2019/20 financial year, from 1 April 2019 – 31 March 2020 average corporate performance stood at 72% with the quarters, from Q1 to Q4 scoring 79%, 69%, 77% and 61% respectively.

Research and Development Performance

BITRI research portfolio has been showing steady progress in all the six research areas. During the 2019/20 financial year, two research and development projects completed were; Mmualebe Customer Feedback Application and the Climate Variability and Change Risks and Management Project (Development of Decision Support Systems for Dryland Small Scale Arable Farmers). The Mmualebe Customer Feedback Application is currently being piloted at all BAMB branches country wide and Climate Smart Agriculture; Lessons Learnt Manual has been developed and shared with all relevant stakeholders. 35 other research and development projects were on-going and at different completion levels as shown in the Technology Readiness Levels assessment below.

RESEARCH FOCUS AREA	R&D PERFORMANCE PER QUARTER			
	Q1	Q2	Q3	Q4
1) Develop Optimal Software Systems (IST)	100%	50%	90%	15%
2) Development of Nano Material Based Solutions for Diagnostics and Filtration	62%	44%	68%	57%
3) Improve Capacity of the National Economy to Respond to Climate Change Challenges	87%	60%	55%	62%
4) Smart Systems Technologies (Electronics & Communications)	57%	61%	58%	100%
5) Development of Clean Energy Solutions for On and Off-grid Applications	95%	65%	70%	48%
6) Development of Building Materials from Natural Resources and Industrial By-Products/Waste	100%	-	100%	100%
Average Projects Performance	**84%**	**56%**	**74%**	**64%**

Strategy

TRL	DEFINITION	# OF R&D Projects	BITRI RESEARCH AND DEVELOPMENT PROJECTS							
1	Idea/Concept of innovation	0								
2	Concept development	3	TIBA Project	Develop titanium-reinforced polymer material for regeneration.		Develop a Portable hybrid solar biomas solution (Cookstove)				
3	Applied research/ R&D initiated	1	Beef Measles							
4	Technical development	5	Lumpy Skin Disease Diagnostic Kit	Develop polymer based composite membranes for detection of CO	Investigation of the potential of local raw for Portland Cement for Clinker production	Technologies for the purification materials of waste and salty water	Development of cellulose based filters			
5	Lab-scale model development and validation	7	Develop skin wearable sensors for remote patient sensing of vital signs.	Mineral Beneficiation (Coal to Specialty Chemicals)	Development of Biomass to Energy	Filter Material for Chemical and Biological Agents of warfare	Intelligent Transport System	FMD SAT 1,2,3	Water Quality and Sanitation and the BITRI WSN system	
6	Pilot model development and validation	3	Gravity-based nanofiber filter	Development of other filter media for water filtration		Development of Greener extraction of the nickel and copper from BCL copper nickel matte				
7	System prototype development and validation	6	Matimela App	Converting nickel and copper extractsto value nickel and copper compounds and nanoparticles	FMD Kit (NSP)	Nanofiber dust Masks	School Management System	Kwibi (INtsu)		
8	Product testing and validation	0								
9	Finalization of product manufacturing specifications	0								

DEPARTMENTS

Natural Resources And Materials

Technologies

Research And Partnerships

Human Capital

Finance and Operations

BITRI Departments

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE

NATURAL RESOURCES AND MATERIALS

BUILDING MATERIALS SCIENCE

The BMSD focuses on needs-based research and development (R&D) of new innovative building materials from natural raw materials and industrial by-products or wastes. It also develops technologies for re-cycling conventional building materials, identifies new/innovative uses of the same and modifies conventional building materials to improve their performance. In addition, the Division hand-holds companies, especially start-up companies, that take up the new/innovative building materials developed in-house or are developed by other entities and evaluated by the BMSD as fit-for-purpose.

In executing the latter, the BMSD collaborates with key stakeholders such as the Botswana Bureau of Standards (BOBS), Departments of Building & Engineering Services (DBES), Housing, Botswana Housing Corporation (BHC). BMSD also develops algorithms for the selection, specification & quality assurance of materials for given applications, to meet the following requirements:-

a) Cost-effectiveness of both production & application
b) Environmental friendliness of processes of both extraction/production & application
c) Fitness for purpose
d) Aesthetic appeal

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

Project Implementation and Milestones

During the reporting period the Building Materials Science Division (BMSD) executed the following projects.

Kgalagadi Sand Building Block/Brick (KSBB) Technology Rollout

By the end of the reporting period, one KSBB depot at Artesia was commissioned while the commissioning of the Ghanzi depot was held up due to the requirement to adhere to COVID-19 protocols.

The construction of another three depots at Charleshill, Gumare and Maun were still ongoing, with the latter two being close to completion. Five operational KSBB depots at Kasane, Lehututu, Maubelo, Phitshane-Molopo and Takatokwane were yet to be handed over to the respective District Commissioners' Offices. One industrial plot was acquired at Kang and architectural planning was completed for the Gasita plot.

Approval of architectural plans for two plots at Tsootsha and Ncojane was granted by the Local Authorities. Construction of the five KSBB depots at Gweta, Motopi, Ncojane, Seronga and Tsootsha did not take place as planned due to delays in the completion of Batch 2 depots at Artesia, Charleshill, Ghanzi, Gumare & Maun, as well as delays in the issuance of lease agreements for plots of Batch 3 depots in Gweta, Motopi, Ncojane, Seronga & Tsootsha.

Production of KSBB-specific Cement Blend

In the reporting period, an order for 400 tons (8,000 fifty-kg bags) of blend was placed with Kago Phepa (Pty) Ltd & accordingly paid for by BITRI. The blend was procured for the sole purpose of training of beneficiaries in the good practice of KSBB Technology at newly completed KSBB depots, over a period of six months. By the end of the reporting period, BITRI had collected 4,400 bags from Kago Phepa (Pty) Ltd.

Trial Property Development Using KSBB units

During the reporting period Botswana Housing Cooperation (BHC) had designated six housing units to be built using KSBB in Tsabong. By the end of the reporting period, four of the houses were at ring beam level, one was at 6th course from floor level and construction of the sixth housing unit was yet to commence. The construction of the sixth housing unit was incumbent upon release of funds by BITRI, as this unit was to be part of BITRI's Corporate Social Responsibility programme.

BITRI Departments

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

Investigation of the Potential of local industrial minerals for Production of Portland Cement Clinker

By the end of the reporting period, drilling & core sampling at Tsokung & Serorome Valley was completed. Core sample preparation, testing & analysis of test results for Tsokung & Serorome Valley was completed. Resource estimation & bulk sampling of Letlhakeng Calcretes was 25% complete.

Accreditation of the Building Materials Science Laboratory (Laboratory Quality Management System (ISO/IEC 17025)

By the end of the reporting period the following planned work packages were 100% completed:-

- Accreditation of the BMS Laboratory for Tensile & Compressive Strength Testing
- Transitioning to ISO/IEC 17025: 2017
- Capacity Building for Tensile Strength Sample Preparation
- Development of Cement Testing Capability – Equipment Acquisition & Commissioning of same
- Management Review Meetings
- Internal Audits & Customer Perception Survey
- Preparation for Surveillance Audit by SADCAS
  (The Surveillance Audit, which was scheduled for March 16, 2020, was postponed until further notice, due to the spread of the COVID-19.)

Investigation of Effect of Admixtures (locally available off-the-shelf) on Rate of Strength Gain & Durability of KSBB

By end of reporting period the repeat durability tests work package at two South African laboratories was completed. Only one of the two laboratories had submitted the test results by the end of the reporting period. Given that the submission of the test results from the second laboratory; testing for durability of the KSBB at the BMS Laboratory & preparation of the comprehensive report on this project are the only outstanding tasks, this project is 98% complete.

Investigation of Potential of Local Clays for Production of Refractories

In the course of the reporting period, a decision was made to put this project on hold, pending availability of geologists with the requisite skills, for its uninterrupted execution. An understanding exists between BITRI & Botswana Geoscience Institute (BGI) as a Collaborating Partner, that the geologist would be provided by the latter.

BITRI Departments

Investigation of Potential of Dipotsana Slates for Production of Selected Building Products

The proposal for this Project was developed at the tail-end of the reporting period. By the end of the reporting period, the Project Manager for this Project had been identified & the Plan for the execution of the Project had been fully developed.

Staff complement

The Division opened the reporting period with a staff complement of 25, falling into two categories. Category one comprised of seven researchers in the direct employ of BITRI, comprising of one Lead Researcher, one Senior Researcher and five Associate Researchers. Category two was staff indirectly employed by BITRI for the execution of the Economic Stimulus Programme (ESP) driven KSBB Technology Rollout Project comprising of one Project Manager, two Associate Researchers, four Resident Engineers, nine Trainer Artisans and two Clerks of Works.

BITRI Departments

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

CLIMATE CHANGE

The Climate Change Division focuses on four priority areas of the Botswana National Research, Science and Technology Plan 2005: namely agriculture, health, water resources and energy. The specific objectives are to address the four areas of research through evidence-based research and upscaling of the results as decision support tools and technologies to household and the national level. In this regard, the division carries out user-inspired research that advances decision support process for the agriculture, health, energy and water sectors for a changing climate; Communications and Knowledge Management: Convey climate change and extreme weather risk, impacts, opportunities, and solutions clearly, succinctly, and in a way understood unambiguously by the end user.

Services: Prototype and develop new methods and products to quantify and exploit climate change opportunities and reduce risks.

Project Implementation and Milestones

During the reporting period the Division had seven projects running as follows;

a) **Climate variability and change risk assessment and management: Development of Decision Support Systems for dry land small scale arable farmers in Barolong and Kgalagadi south sub-districts**

The aim of this project was to reduce the impact of climate change on small holder farmers by strengthening their adaptive capacity to make their livelihoods more resilient.

The project was completed and the project product **A Lessons Learnt Manual, a Field Guide for Implementing Climate Smart Agriculture under Smallholder Arable Farming Systems was launched.** The project achievements were through collaborative efforts between Botswana Institute for Technology Research and Innovation (BITRI), Global Environment Facility GEF/ Small Grants Programme (SGP) implemented by UNDP, the Ministry of Agriculture and food Security Development and Smallholder farmers in Kgalagadi South and Barolong sub Districts. The inputs of the Department of Meteorological Services on climate data downscaling and analysis and capacity building on analysis and interpretation was invaluable.

The project demonstrated that adoption of climate smart technologies and practices through community participation can assist in identification of relevant adaptation practices and subsequently improve livelihoods.

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

b) Out-scaling and up-scaling Climate-Smart Agriculture in smallholder farming Masunga: SAMA Cluster

BITRI partnered with the Ministry of Agricultural Development and Food Security (MADFS) and Masunga Community to upscale Climate Smart Agriculture as a strategic priority for the attainment of food security by smallholder farmers in the midst of climate change using SAMA cluster (Masunga), as a case study. SAMA cluster has been selected to serve as a demonstration site for Climate Smart Agriculture implementation under cluster sat up.

The project team submitted a proposal to the Ministry of Environment, Wildlife and Tourism's National Environmental Fund (NEF), and received a grant award to the value of P627,360.00 (Six hundred and twenty seven thousand three hundred and sixty Pula to augment its evidence based research activities at SAMA. Another funding proposal submitted to Southern African Science Service Centre for Climate Change and Adaptive Land Management (SASSCAL). These external funds will augment BITRI budget on the project.

For the current planting season, 2019/2020; November 2019 to January 2020, SAMA cluster received very poor rains; 97mm, temporally distributed as; 41mm November, 51.8mm December, 4.2 mm January. Temperatures were mostly above 40 degrees Celsius, and the combined effects of low rainfall and high temperatures resulted in crops not performing well. Thus the project is looking at alternative livelihoods besides rainfed farming as potential coping approaches.

c) Downscaling climate change scenarios to spatial scales relevant for risk management and policy decisions

This project entails developing and adapting various techniques to downscale global climate model projections to sub-country scales. The current research focuses on the use of already available Coordinated Regional climate Downscaling Experiment (CORDEX) Africa downscaled dataset and provides an analysis over Botswana. Climate change scenarios of temperature and precipitation at national, district and sub-district levels will be provided in order to aid in policy making, climate change risk assessments and management as well as development of adaptation options for climate change and extreme weather events.

There are two main stages to this project, the first stage entails assessing whether the CORDEX models that have been selected for assessing potential future changes in temperature and precipitation over Botswana are fit for purpose. This evaluation stage takes into account comparison with observations. To do this, gridded temperature and precipitation observations from the University of East Anglia's Climatic Research Unit (CRU) have been used and several metrics and tools for assessing the usefulness of the models have been applied.

BITRI Departments

The metrics include among others the ability of the models to capture spatial climatological patterns, the seasonal cycle, key statistics of Botswana's climate at monthly, seasonal and annual timescales, taylor diagrams and quantile-quantile plots. All the analysis have been performed over the entire country and over the North-East district. A report was being written on the results of the first stage of the project.

In the second stage of the project, the projected future changes in temperature and precipitation over Botswana based on the CORDEX model simulation are investigated. The changes are investigated firstly at mid-term and long-term time periods corresponding to the mid-twenty-first century and the end of the century timescales. The changes are then assessed at key temperature targets of 1.5 and 2.0 Celsius above pre-industrial levels. Analysis on this stage has commenced with some initial results already available for country-wide projections and the North-East District. An extension of all the analysis to other districts of the country will follow shortly after.

d) Climate-Proofing Water Resources in Botswana: Policy and Technical Dimensions Status.

The aim of the project is to assess the potential impacts of climate change on the available water resources in Botswana and hence develop adaptive management strategies in order to improve the sustainability and security of the already limited water resources. The project's milestones for the year 2019/20 included developing novel approaches that evaluate the potential effects of climate change and provide adaptive and sustainable solutions for agricultural irrigation and domestic water supply; development of reservoir operating rules for each multipurpose reservoir (Lotsane & Thune dams) and comparison of the proposed reservoir operation rules with the current policy in order to quantify risks and benefits of the recommended results versus the traditional practice, before implementation of the results. The following activities were conducted in order to facilitate successful completion of the stated milestones:

- A model framework is set to evaluate the potential effects of climate change on the operation of multipurpose reservoirs as well as the management of the associated irrigation schemes, with the aim to compute adaptation and sustainable intervention measures towards optimal water sustainability in areas of interest. This evaluation entails integrating regionally downscaled climatic parameters for the periods 2012 – 2018 (baseline data), 2030 – 2040 (near future) and 2090 – 2100 (far future). The required climatic dataset was requested from the Council for Scientific and Industrial Research (CSIR) in South Africa. However, part of the required data was not available in the received datasets (e.g. reservoir inflow, open water evaporation, sunshine hours), thus leading to exploring different approaches of generating this unavailable data. Therefore, a shift into hydrological modelling using Soil and Water Assessment Tool (SWAT) was done in order to simulate monthly reservoir inflow for the period under study.

The developed model was tested successfully for Lotsane irrigation scheme using data that was collected on site, climatic parameters received from CSIR and the hypothetical datasets in the case of unavailable data. Intensive literature review is continually carried in search for approaches of dealing with other unavailable data.

- Relative to this project, the researchers developed a proposal titled; **'Water-Energy-Food Nexus for Adaptation and Mitigation of Climate Change Towards Sustainable Food Production, Efficient Use of Resources and Improved Livelihoods from Dikabeya Irrigation Scheme'.** The proposal attempts to implement/pilot part of the results of this research in a small-scale irrigation farm near Dikabeya dam for optimal irrigation-reservoir operation practice. This proposal was submitted on the 9th of March 2020, for funding opportunity (grant) following the 'call for standard proposals on climate change mitigation and adaptation in Botswana' that was advertised by the Global Environment Facility Small Grants Programme (GEF/SGP).

- In addition, two manuscripts were drafted to be submitted to high impact journals for peer-review before implementation in order to assure quality of the research findings.

- The developed model framework could eventually be used to study opportunities of sustainable water use under the changing climatic conditions in any other water resources in the country that is related to irrigation practice besides the two multipurpose reservoirs (Lotsane & Thune dams) that are taken as study sites.

e) Balancing food security and soil carbon emissions under smallholder farming systems in Botswana

The small-scale arable agricultural sector has persistently under-performed due to harsh environment characterized by recurrent droughts, unreliable rainfall, and extreme temperatures associated with climate change. In light of the projected changes in climate, hash environment leading to food insecurity, it is imperative to adopt adaptation measures that could climate proof productivity in an environmentally and socially sustainable way, strengthen farmers' resilience to climate change, and reduce agriculture's contribution to climate change by reducing greenhouse gas (GHG) emissions and increasing carbon storage in farmlands. The aim of this project is to apply climate smart agriculture solutions to pilot farms, and to demonstrate to small scale farmers the importance and effectiveness of CSA in respect to food security and soil carbon sequestration.

By the end of this reporting period, field data collection on greenhouse gas emission for dry and wet seasons had been conducted. Furthermore, soil biogeochemical analysis was completed.

BITRI Departments

f) The Energy Poverty-Climate Change Nexus in Rural Botswana: Renewables, the Missing Link

The overarching aim of the study is to assess domestic fuel poverty or lack thereof in rural communities and how they adapt to such challenges to promote renewable energy use and energy efficiency. The baseline study in Kweneng West sub-District on the prevalence of energy poverty has been completed. The findings of the study helped in the identification of energy efficient measures to help alleviate energy poverty in the study areas.

Four villages of Tshwaane, Maboane, Khudumelapye and Distshegwane were chosen as study sites. These were chosen based on fact that electricity was not widely available in the villages and therefore most of the people rely on kerosene and wood for their energy needs.

The first part of the study sought to determine the extent and causes of energy poverty as well as household responses to these challenges. This phase took the form of a questionnaire that was administered by 2 trained enumerators from each village. 30 families were targeted per villages.

Analysis of the data showed among others that:

- Firewood was a primary source of fuel
- Women and girls were main collectors of firewood
- Firewood was becoming increasingly scarce near the villages
- Due to poor rains over the years, there was little to no re-growth of trees in the vicinity of the village
- Firewood collectors needed to walk long distances from the village to get firewood, exposing them to various forms of danger.

In view of the above, urgent solutions were required to address energy poverty and its associated issues. Efficient cook stoves were therefore identified by most respondents as an initiative to help alleviate energy poverty. In consultation with the Village Development Committee (VDC), five households per village were identified. The criteria used here included those whose only primary source of energy was firewood. Twenty efficient cook stoves were thus demonstrated and distributed to these families. A monitoring tool in the form of a matrix was given to the VDC to help them in the daily monitoring of the use of the cook stoves. The matrix for evaluating the stoves as well as the Socio-economic profile of the users of the cook stove were handed to the VDC to collect data.

Preliminary results are that the stoves have improved the lives of those who have consistently used them. However, there has been challenges where beneficiaries have gone back to using fire for various reasons including;

- Elderly beneficiaries found them to be too heavy to move from one place to another
- The stove gives out too much smoke when first lit and therefore cannot be used indoors
- A few lost the initial interest and reverted to their old ways.

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

Due to the limited number of households piloting the stove, it was agreed to increase the sample of household per village in order to get data that better represents the population of the project sites. The project therefore acquired a further 20 cookstoves and these have been distributed to 5 more households per villages as identified by the VDCs. It is hoped that these new beneficiaries will use the stoves consistently to enable meaningful analysis. The task of the distribution and monitoring commenced mid-February 2020.

g) Rainfall measurement from cellphone signals: Implementation

This is phase two of an earlier project study that explored the possibility of using commercial cellular towers to monitor rainfall. The initial phase considered only Werda and Gantsi. The second phase of the project entails upscaling to evaluate it and implement it in about 300 BTCL towers that are distributed around the country. At the end of the reporting period, a Memorandum of Understanding between BITRI and BTCL had been signed. A technical team between BTC had been formed and already had several engagements such as meetings, presentations and dialogues. The automation of the Network Management System is underway to facilitate recording of signals performance data from the towers.

Staff Complement

By the end of the reporting period the Division had a staff complement of nine comprising of one Lead Researcher, one Senior Researcher, one Researcher and six Associate Researchers.

BITRI Departments

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

NANOMATERIALS

The Nanomaterials Division is mandated to perform research that makes use of nanotechnology and other technologies to develop products that address the needs of Batswana; the Division also works to elevate the research and technology landscape of Botswana globally. The Nanomaterials Division operates in three defined project focus areas; namely Diagnostics, Filtration (Air and Water Filtration) and Mineral Beneficiation (Specialty Chemicals). Research in these three focus areas are underpinned by the availability of state-of-the-art instruments and equipment that are housed at the Centre for Material Science (CMS).

The Division has a multidisciplinary team made up of chemists, physicists, biologists and a chemical engineer.

Project Implementation and Milestones

a) Diagnostics

There were three projects in the diagnostics focus area; namely Foot and Mouth Disease project, Lumpy Skin Disease and Beef Measles Disease. All of these are targeted towards developing pen-side point of care diagnostic kit for the detection of these three animal diseases.

The BITRI Foot and Mouth Disease (FMD) Lateral Flow Device (LFD) started in 2016, in partnership with the Canadian Food Inspection Agency (CFIA), the Botswana Vaccine Institute (BVI) the Botswana National Veterinary Laboratory (NVL). Validation of a BITRI-CFIA LFD prototype of FMD test strip, produced by BioAssay Works (BAW), was completed in 2018; using four FMDV NSP ELISAs and the BITRI-CFIA lateral flow device (LFD) for the detection of FMDV NSP antibodies. The sensitivity and specificity of PrioCheck NS, the industry standard, is not significantly different from the BITRI-CFIA LFD; but the BITRI-CFIA LFD has significantly higher diagnostic sensitivity compared to the other NSP ELISAs; SVANOVA, 3ABC and Idexx, which are all currently on the market. Though the BITRI-CFIA LFD test strip's performance is comparable to the most sensitive NSP ELISA, it still needs to be optimised. Ongoing optimization work on the strip included introducing a nitrocellulose membrane because the membrane used for the current prototype has been phased out by the manufactures.

b) Air Filtration

BITRI continued the development of its nanofiber membranes in partnership with Greenline Technologies, South Africa to make dust masks using BITRI nanofibers to make about 1 000 flat masks. These masks were subjected to the complete certification tests for an FFP2 the equivalent of an N95 mask) at a South African Bureau of Standards accredited laboratory and passed all the tests. The masks were also tested at Nelson Labs in the United States of America for viral filtration and were found to exhibit viral filtration efficiency of 99.6% to 99.9%. It was on the strength of this viral filtration efficiency data that BITRI donated 500 of these masks to the Ministry of Health and Wellness at the onset of the Covid-19 pandemic. BITRI is currently pursuing avenues to commercialize the production of this highly efficient filter material.

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

The Air Filtration team is also working on developing materials to use on coveralls to address chemical and biological warfare agents. By the end of the reporting period the nanofiber based material was prepared and the team was busy trying to incorporate various neutralizing agents that would potentially deactivate chemical and biological warfare agents.

c) Water Filtration

During the reporting cycle the Water Filtration group continued the development of water filters and water purification technologies. Below are highlights of some of these projects:

d) Desalination

A hydrophobic paper membrane for desalination was fabricated from the modification of cellulose extracted from Sisal (Agave sisalana). Although the membrane still needed to be perfected, the progress that was made (highest hydrophobicity 101°) clearly showed that the team was on the path to developing a membrane that could potentially be used for desalination by membrane distillation.

The assembly of a laboratory scale membrane distillation set-up for testing desalination performance of flat sheet membranes was also completed. Experiments using commercially available polypropylene membrane were conducted of which the highest salt concentration water that was distilled was at 6.2 wt%. The pilot scale membrane distillation set-up for testing desalination performance of spiral bound modules was installed. However, modifications to simplify the flow of water and monitoring of process parameters still needed to be completed to allow experiments to be conducted effectively.

e) Removal of heavy metals, microbes and fluorides

A composite column filter consisting of three layers of bone char granules, fly ash/polymer granules and coal granules was developed. Although the flow rate was low which can be improved by adjusting the design of the assembly, the results obtained showed practically useful arsenic (75%) and fluoride (67%) removal efficiency.

The cellulose extracted from Prosopis Glandulosa was used to fabricate an electrospun nylon 6/cellulose composite membrane. The flat sheet membrane showed promising results to improve the performance of the nylon cartridge prototype based on E. coli removal (100%) and heavy metals removal (96% for chromium, copper, lead and cadmium).

BITRI Departments

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

f) Specialty Chemicals

The specialty chemicals group is working on mineral beneficiation projects namely; coal and copper-nickel beneficiation. The coal beneficiation (i.e. coal to liquids (CTL)) research is aimed towards transformation of coal into higher value commercial products such as liquid fuels and petrochemicals for the Botswana and the international markets. The team has established that gasification of Morupule coal on the BITRI gasification pilot plant generates synthesis gas (syngas, CO + H2) in a of ratio 1:1.4 (CO:H2). Also significant progress has been made with regards to conversion of syngas to methanol. In two related projects, the team used a Cu/ZnO catalyst to selectively transform carbon dioxide to methanol and a nickel-based catalyst to hydrogenate carbon dioxide to methane (CO2 methanation). The team continued to optimize all these processes for fuel production. The syngas to methanol process is ready for piloting.

The copper-nickel beneficiation project's objective is to explore and adopt, and/or develop innovative environmentally friendly "greener" technologies in the extraction of copper and nickel from the copper-nickel concentrate or matte, tailings, slag and low-grade copper-nickel ores. We have developed a sequentially leaching method that extracts nickel (94% recovery), followed by extraction of copper (98% recovery). The nickel extract can be used to produce battery grade nickel sulfate. We are currently in talks with a Canadian metallurgical company (Process Research ORTECH) to scale up this extraction process.

g) Centre for Materials Science (CMS)

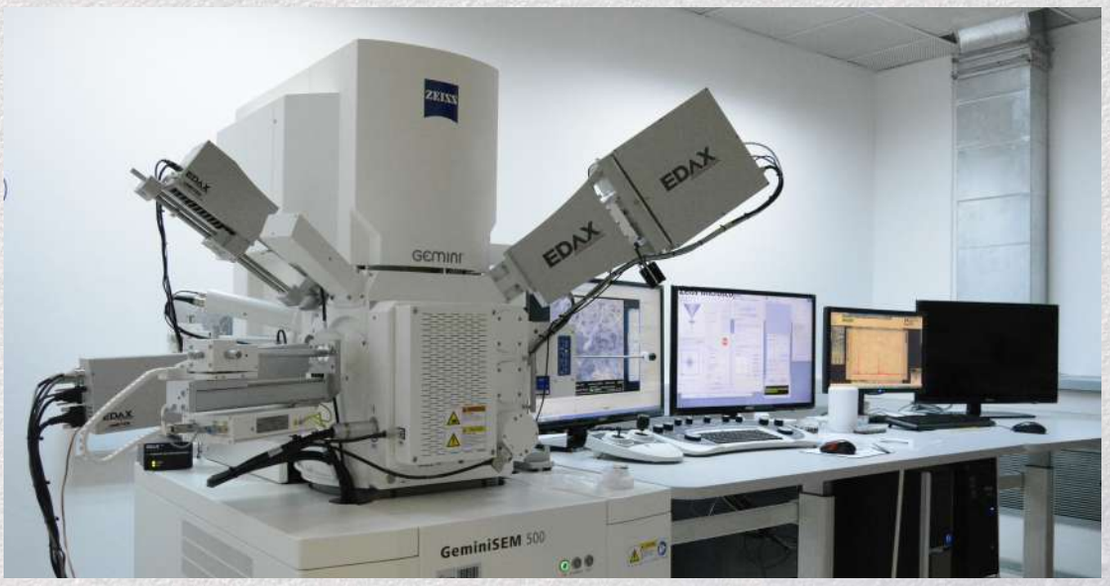
The CMS continues to participate in the National Quality Control Sample Exchange Scheme organized by BOBS. The CMS also became the place BOBS sent people for testing of hand sanitizers at the onset of COVID-19.

The ISO17025 accreditation programme continued during the reporting period culminating in the CMS submitting all outstanding documentation required by SADCAS for general management of the CMS and ICP-MS_1 method for the determination of chromium, manganese, cobalt, copper, zinc, arsenic, cadmium, barium, lead and selenium in water. The CMS expect full accreditation of the above two areas during the 2020-2021 financial year.

Staff complement

By the end of the reporting period the division had a staff complement of 31, comprising of one Lead Researcher, four Senior Researchers, one Senior Instrument Specialist, ten Researchers, eight Associate Researchers, four Associate Instrument Specialists and three Interns.

BITRI Departments



BITRI Departments

TECHNOLOGIES

ELECTRONICS AND COMMUNICATIONS

The Electronics and Communications (E&C) division is focused on key developmental and innovation areas such as;

a) Providing essential electronics and communications platforms to facilitate economic viability of the electronics industry in Botswana and beyond. These include setting up Botswana's first electronics manufacturing plant, as well as current work towards a fully-fledged wireless sensor network (WSN) platform that will support various industries through localised servers. It will also aid in comprehensive data analytics as and when required for a more evolutionary industry.

b) Research and development in consumer electronic products based on the needs and demand from industry, customers, and other stakeholders.

c) Technical developments in control electronics where performance bottlenecks are identified in current technologies

The E&C division has extensive experience in electronics production and communication systems and as such offers consultancy to accelerate stakeholder projects towards market viability.

Project Implementation and Milestones

a) Seding Solar Street Light(s) v2 and v2.5

There have been various iterations and/or versions for the Dicision's solar streetlight, named Seding v2 and v2.5. This light originated to improve on the BITRI imported Seding v1 light from Singapore. Through stakeholder engagements, the subjective and perceptual compromise between design factors such as luminance, physical design, cost of production, among others, led to development of the Seding v2 2000 and 3000 lumens. The electronic design of this light has since been completed in 2018/19 with all performance issues such as production errors addressed. In March 2020, close to 4000 PCBs of Seding v2.5 (3000 lumens) were produced with over 98% success rate. The Division further provide three different PCB production variants to account for any future component bottlenecks that may hamper mass production. The light was installed at various places in Botswana such as Moshupa and Letlhakane.

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

b) Intelligent Transport Systems (ITS) – Next Generation Routing Systems

In this project the Division extensively studied the current and popular systems deployment world-wide such as the infamous SCAT, SCOOT, COMPASS, and RESCU (among others). It was noted that the adoption and deployment of an ITS system depends largely on Performance history and certification of the ITS system in terms of road safety, and alliance towards technological trends such as 4-IR. The study revealed that it was not possible to immediately replace the existing ITS due to the need for comprehensive road and safety track record and advocate for re-installations as they could be quite costly and often the performance improvement in traffic control efficiency was minimal from one system to another.

However, it was noted that the general systems have shortcomings that can be significantly improved on, such as the power consumption by a basic four-way traffic control equipment, inclusive of recent controllers, which can be around 250-300kWh which means a hefty bill just to keep the control systems fully functional. Because most of the current ITS systems are server based they require costly and highly reliable networking systems to be installed between the city-wide traffic control equipment and the control station(s), thereby leading to hefty communication and/or maintenance bills. It is through knowledge of adaptive and optimization systems and smart low power electronic control systems that the Division proposed a new ITS systems that eliminates the need for power hungry traffic control equipment as well as development of a much more efficient lighting systems such that power consumption is at a minimal.

This may allow the use of green energy harvesting system to power most junction control equipment. The reduction in power bills will likely have a buy-off period where cost of implementing proposed system out-weighs the conventional ones by savings on power consumption bills. This will also eliminates the need for expensive communication infrastructure by adoption of smart and adaptive traffic routing algorithms localized at each junction. In addition it may eliminate the need for city-wide communication infrastructure as basic wireless communication systems or cabling can fit the requirements without the need for monthly subscription bills as it can be integrate into existing systems such that certain intelligence aspects may be used to enhance their efficiency as well as reduce overall cost of running.

By the end of the reporting period the Division had studied various ITS systems and identified their pros and cons. It also studied and simulated existing smart routing algorithms and systems to develop competence amongst its Associate Researchers as well as develop a functional processing block for the proposed system followed by feasibility analysis of each block prior to resource commitment for system development. This step was essential to minimize chances of failure such that the project may be closed out if need be, or the key focus areas may be singled out and develop a working vehicle sensor that can detect presence of a vehicle, its speed, size, direction of travel, as well as detection of side traffic on neighbouring lanes. This sensor will undergo further fine tuning to reduce power consumptions and utilization of more efficient processing steps as well as incorporation of appropriate WSN communication protocol for interface with the smart control boards at each junction.

BITRI Departments

In future the Division will conduct studies where there are various sub-systems that have been considered as functional blocks only. While these have been part-verified to be feasible, in the coming months they will be considered in more detail. They will also look into the derivation of more appropriate routing algorithms to mimic a fully networked and conventional ITS system but without the costly communication infrastructure. The proposed ITS system will eventually undergo thorough road and safety tests as per the required standardization procedures such that it may compete with established systems.

c) WSN Communication Platform Upgrade for Commercialization:

While the Division has a fully working prototype for water quality and sanitation monitoring system deployed at Maranyane House, this project looked at the commercialization requirements that need to be addressed to get a nationwide WSN system in place such that it may be used as a platform to enhance the various economic sectors. By the end of the reporting period the LoraWan, ZigBee, and SigFox communication protocols were implemented such that various sensors could be integrated.

Through use of appropriate control boards the sensors can have their data readings sent to a local control/master node or router, which can either send the data to a BITRI server through backhaul network (e.g. GPRS/3G, TVWS, or any applicable communication means) or through a LAN if in close proximity to the BITRI server. A user can log into the BITRI server from a smart device and view real-time sensor readings throughout the day. Consideration of the Botswana communication landscape such that a nationwide proposal for WSN feasibility may be derived was also completed. Stakeholder engagements such as WUC (for the water quality and sanitation monitoring project) to present and demonstrate the current possibilities as well as way forward in terms of upgrading the WSN platform was done.

After a consolidated business case, a stakeholder workshop to present the findings, possibilities, and funding requirements will be held such that the next phase is on implementation and service provision and the integration of more prototype WSN projects to cover various stakeholders.

d) Electronics Manufacturing Plant

By the end of the reporting period the proposed electronics manufacturing plant was at an advanced stage. What was outstanding was the procurement of THT, inspection, and complete re-work equipment. Recruitment of personnel was almost complete.

Staff

The Electronics and Communications division comprises of one Lead Researcher and seven Associate Researchers.

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

ENERGY

The Energy Division focuses on needs-based research, development and adoption of Energy technologies (renewable and non– renewable) for Botswana. In addition to research and development, the Division also offers training and consultancy on energy related technologies.

Project Implementation and Milestones

During the reporting period the projects undertaken were as follows:

a) Solar Traffic Lights

Following conclusion of the testing phases for both the DC and the AC traffic junctions, the work focused on building a business case solar PV traffic junctions relative to normal grid-connected traffic junctions.

b) Quantifying the Financial Costs and Benefits of Renewable Energy Resources in Botswana's Electricity System

Work with the department of Energy (DoE) led to the development of an integrated resource plan (IRP) . On adoption by the Government of Botswana it will be a key input into the final piece of the study, foresight analysis which will not only quantify the financial and environmental benefits of integrating renewables into the grid, but indicate the most optimal timing for bringing new generation capacity over the next twenty (20) years.

c) Energy Efficient Cook Stoves

The stove has been piloted at three villages in the Kweneng District. Hybridasation of the stove has been continued with a design that incorporates solar into the existing thermal design. The hybrid stove is to be prototyped, tested and piloted during the 2020/21 financial year.

d) Solar testing platform (STTF)

Work has focused on developing the necessary protocols and documentation to get the facility accredited. Progress has been slow due to loss of key staff members.

e) Biogas Project

Work centred on material choice (brick and mortar, fibre glass and plastic) for the digester as well as the socio-economic and technical analysis of the existing 28 brick and mortar pilot sites and substrate analysis. Implementation of the project has since shifted to the Department of Energy to deliver 200 bio-digesters whilst BITRI completes the research during the 2020/21 reporting period.

Staff

By the end of the reporting period the division had a staff complement of four comprising of one Senior Researcher and three Associate Researchers. It is to be noted that during 2019/20 reporting period, one Post-doctoral fellow and two Associate Researchers resigned. In addition to the four staff members there are three UNDP staff members for the facilitation of the biogas project including Project Manager, Project Engineer and the Finance and Administration Officer

BITRI Departments

INFORMATION SYSTEMS TECHNOLOGIES

Information Systems Technologies Division focuses on research and development to provide technology solutions and next generation products in nine priority areas of Health, Education/Learning, Tourism, Agriculture, Transportation, Security & Forensics, Entertainment, Communication Infrastructures, and Energy.
Project implementation and milestones

a) Mobile Tutoring System for Botswana

This project is part of the 'Education Informatics System for Botswana. The Mobile Tutoring System for Botswana is part of the project about mobile application which drills pupils on their subjects and simulates examination. The project focuses on developing a mobile tutoring system for secondary schools. It will address issues of flexible and low cost access to tutoring material.

By the end of the reporting period, the 'shell' application was complete and only content was to be uploaded. The Division was working with Kagiso Secondary school for content generation, formatting and structuring. The expected date of completion was October 2017. There has been delay in acquiring the content for the application. Following difficulties to obtain content and, for the purpose of pilot testing and evaluating the App, IST has moved to procure Mathematics examination questions for the application but due to staff constraints, inputting questions into the App has been slow.

b) Web Based Tutoring Application

This project is part of the 'Education Informatics System for Botswana, The project is about desktop based application which drills pupils on their subjects and simulates examination: The project is a replica of the mobile application on a web-based platform albeit with enhanced capabilities such as student/teacher/parent/ headmaster report generation. It was envisaged that certain analytical functionalities will later be added. By the end of the reporting period reports modules/capability were to be added and content to be uploaded. The Division was working with Kagiso Secondary School (KSSS) for content generation, formatting and structuring. KSSS had pledged a lab for BITRI to use for education technologies in general. The envisaged date of completion was October 2017. The Laboratory at KSSS has since been installed with twenty (20) low cost computers, office furniture and internet connectivity via TVWS technology. IST has moved to procure Mathematics examination questions from training/ tutoring organizations for purposes of pilot testing and application evaluation. The questions have been procured and incorporated into the App. What remains is to deploy the App at KSSS for piloting purposes.

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

c) Remote Patient Monitoring

This project is part of the Health Informatics System for Botswana and focuses on remote monitoring of Non-Communicable Diseases including Hyper Tension, cardiac arrest and Diabetes. By the end of the reporting period the project team was engaged in requirement gathering, design and development and security testing. The project was delayed due to human resource constraints. The Project completion was estimated at April 2018. The BETA version of the system is complete; Testing of BETA is done; enhancements due to feedback from internal quality testing is complete.

The system is being prepared for evaluation by medical doctors (private and government) prior to pilot testing at medical centers (Scottish Livingston Hospital and associated clinics). During the reporting period the Division had a review meeting with medical doctors and their feedback has been incorporated . IST had hoped to pilot this system at Scottish Livingstone Hospital but upon demonstrating it at the Ministry of Health, the Ministry advised IST to build, improve and enhance the Ministry Patient Information Management System (PIMS) around a developed system.

By the end of the reporting period IST was working out logistics to start the proposed version of the PIMS. There was also interest from Sidilega Private Hospital. BITRI and MoHW were working on formalizing 'broad' collaboration arrangement through an MoU. The PIMS project was due to start in July 2020. This project will be implemented in two phases. Phase 1 being the development of User Requirements and Phase 2 being development and Roll-out of centralized PIMS across 400+ facilities and eligible sites for the Ministry of Health and Wellness. Another related project which was requested and started with the Ministry of Health and Wellness involves the development of a Health Master Facility List.

d) Notification Platform for Animal Disease Outbreaks

Animal diseases and crop-related conditions outbreaks have the tendency to spread and affect a large number of the population of animals and crops alike. Botswana heavily relies on farming and beef exports and any form of platform to inform authorities of any possible outbreaks is desirable, hence this projects .

By the end of the reporting period the team was engaged in re-focusing the notification platform to be generic animal diseases and other crop related conditions & possibly Interface with existing ones. The envisaged date of completion was November 2017.

The application has since been re-aligned for both animal and crop-related diseases culminating in the completion of the BEA version of the App. Delays have been experienced due to unavailability of Veterinary Services personnel who would clarify requirements for further enhancements prior to piloting. Going forward, the division will be working to constitute a collaborative team between BITRI and VET Services in order to finalize the App.

BITRI Departments

e) School Management System

The School Management System is aimed at computerizing school records and providing a convenient platform for the school administration, teachers and relevant Ministry staff to access and manipulate school and student records, thus improving service delivery in an academic environment. Most parts of this system are completed and safe for modifying it into a Web application using spring/hibernate framework and development of such modules as - Assessment, Inventory/facility, library and finance modules as requested by Bakgatle CJSS. The System was being piloted at Bakgatle CJSS. In the coming year the system will also be customized for various clients. By the end of the reporting period discussions were on-going with CITF, BDF and Botswana Police Service. CITF has since been furnished with project budget and implementation plan. Botswana Police Service has requesting that the system be customized to processes at Botswana Police College and BITRI was still waiting for system requirements.

f) Fleet Management

Without proper processes and systems in place, proper and efficient management of an organization's fleet and the associated costs can be challenging. The BITRI Fleet Management System (FMS) supports the day to day management of organizational fleet, with the aim to reduce and minimize overall costs related to fleet mismanagement/misuse and optimize fleet management process efficiencies through proper fleet scheduling (usage & maintenance), implementation of fleet authorization levels, fleet tracking and condition monitoring. This system is complete and is used at BITRI and a pilot was on-going at Botswana Geoscience Institute. In the coming financial year, the system will be customized for various clients. Discussions were ongoing with Botswana Defense Force, Botswana Police Service and the Ministry of Local Government.

g) Matimela

District, city and town councils are responsible for rounding up stray livestock (Matimela) and impounding them until such time that the owners (farmers) collect them – the information about the presence of impounded livestock would then be disseminated to the public for collection. Impounding livestock comes at a significant cost to both the Ministry of Agriculture and Food Security and the farmers. The Ministry is responsible for up-keep of livestock whilst in the impounding kraals and farmers are required to pay a certain charge per day for their impounded livestock (the cost which when calculated cumulatively, often exceeds the cost to acquire or buy such livestock). Currently, information about cattle, such as who the owner is, their identity number and contact details, resides with the Ministry of Agriculture and Food Security. As a result, tracing and contacting livestock owners is slow and inefficient. A meeting was held with farmers association members who provided useful feedback. Requirements have been gathered and incorporated into the system and, discussions are on-going to set VPN with Orange Mobile Network.

BITRI Departments

h) Nthusa – Emergency Response Management System

Law enforcement and emergency services such as the Botswana Police, Emergency Medical Services and Fire Services face a number of challenges in their quest to provide often time-critical services to citizens. This system was developed to improve reposponse time. The syetm was complete by the end of the reporting period and was in the fourth month in operation at Emergency assist 911. The pilot test was on-going at Government Emergency Medical Services in Gaborone and Mochudi.

i) Kwibi – Wildlife Tourism Mobile Application

Tourism contributes significantly to Botswana's economy. The sector is however, not without problems or issues. Amongst these are; human/wildlife conflicts, lack of participation or meaningful gain by local communities from tourism activity in the country, congestion of tourists at national parks, reporting of poaching activities, managing of wildlife resources, and generally enhancement of tourism by attracting potential tourists from abroad. BITRI has been working on a world-first wildlife tourism mobile application that addresses these matters. The Beta version has been presented and demonstrated at the Conservation Lab in Stellenbosch, SA where it was well received by the international community. By the end of the reporting period feedback from the conservation lab was being incorporated, after which the product will go for commercialization.

j) National Integrated Geoscience Information System (NIGIS) for Botswana Geoscience Institute (BGI) – Phase 2

By the end of the reporting period the project was in its third month of design and development. Progress was good and as planned. The applied Geoscience module has been completed and handed to BGI for use and the surveys module was 40% complete.

k) Development of Government Online Portal for Ministry of Transport and Communication

BITRI developed an online Government portal to allow easy and quick access to Government services. This project was completed on budget and on time.

Staff

By the end of the reporting period the Division had a staff complement of 15 comprising of one Lead Researcher, one Senior Researcher, one Researcher and twelve Associate Researchers. In addition the Division hosted 40 interns under the Associates @BITRI programme.

BITRI Departments

RESEARCH AND PARTNERSHIPS DEPARTMENT

The Research and Partnerships Division (R&PD) has a responsibility to ensure that BITRI Research policies and guidelines promote a high-quality research environment and govern good research practice. R&PD supports BITRI researchers to obtain local and international partners, administer grants and contracts, manage the knowledge needs and assists with the technology transfer and commercialization of BITRI technology solutions. In addition, the division is also responsible for ensuring that BITRI's brand is marketed and the excellent technology research and impact in society and the economy is communicated. Divisions under the Department are Communications and Partnerships, Knowledge Commons and Technology Transfer.

1. Communications and Partnerships

Stakeholder Engagement

a. During the reporting period BITRI addressed three Councils; Jwaneng Town Council, South East and North West District Council. The South East and North West were meant to create awareness about BITRI projects and services and market ready products such as Seding and KSBB, as well as get feedback on projects on the ground while the Jwaneng presentation specifically focused on the Biogas project. The objective of the Biogas project was to facilitate low-carbon investments and public-private partnerships in the production and utilization of biogas from agro-waste in the South-Eastern districts of Botswana.

b. The Botswana Institute for Technology Research and Innovation (BITRI) hosted the World Association of Industrial and Technological Research Organizations (WAITRO) Secretariat networking session on Tuesday 5th November at BITRI Maranyane House in Gaborone. The purpose of the networking session was to bring together universities and research institutions to learn about the mandate of WAITRO and further explore opportunities on becoming members to the organization. WAITRO also shared on WAITRO's Open Innovation Hub SAIRA, a platform established to foster international collaboration in research and development and to tackle the United Nations' Sustainable Development Goals by linking researchers with companies, start-ups, NGOs, government agencies, and impact investors in order to transfer technologies and implement innovative solutions on a global scale. WAITRO, consequently convened its 83rd Board and 24th Regional Focal Point (RFP) Meeting in Kasane on November 6th and 7th 2019.

c. As a way of engaging stakeholders and further create awareness about BITRI technologies being developed, BITRI held a media brief on 20 November 2019 where the media was briefed and updated on BITRI technology solutions being developed as well as progress on the BITRI strategic plan. The media was also taken on a conducted tour of the new additive Manufacturing Laboratory. The laboratory allows BITRI to do 3D printing of artifacts from plastics or related and prototypes.

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

d. BITRI launched the Climate Smart Agriculture Lessons Learnt Manual, in partnership with the Ministry of Agricultural Development and Food Security and the United Nations Development Programme (UNDP) Botswana in July 2019. Stakeholders were invited to the event where insights on climate smart agriculture were shared.

Exhibitions

e. In its efforts to enhance the uptake of BITRI technologies, BITRI held stakeholder engagements activities in the form of exhibitions at the Botswana Northern Trade Fair, Human Resource Development Council Conference, BIUST Stem Festival and the Kalamare Investment Fair. The projects that generated a lot of interest from the public were the Signcoach® computer application, Biogas Digestor and Seding® Solar streetlight.

f. BITRI commemorated the World Intellectual Property Day in April 2019 in partnership with the Department of Research, Science and Technology (DRST), Botswana Innovation Hub (BIH), Copyright Society of Botswana (COSBOTS), the American Embassy and the African Regional Intellectual Property Organization (ARIPO). The Theme was "IP and Sports; Reach for Gold". During the commemoration BITRI exhibited some of its technologies (Intellectual Property) such as Signcoach® and Nthusa Computer Applications.

g. BITRI took part in the Ghanzi District Agricultural show from 22 - 28 July 2019. KSBB and Energy Efficient cook Stove were the main technologies displayed. The public showed a lot of interest on both technologies. BITRI also participated in the Lobatse Town Council Open Day on 16th August 2019.

BITRI Departments

h. BITRI exhibited at the Science Week in Good Hope, 4IR Conference held in Gaborone, Global Expo, Electra Mining Expo and the Lobatse Poverty Eradication expo showcasing BITRI products and services.

Seminars

i. To share and exchange ideas on topics of relevance to the mandate, BITRI held four seminars during the reporting period. A seminar was held in April 2019 on the topic "Theranostics in Prostate Cancer" by Prof. Mike Sathekge, Head of Nuclear Medicine Department at the University of Pretoria and Steve Biko Academic Hospital.

j. Two Public Seminars were held in July and September 2019. The July seminar was addressed by Dr Gumbi, Founder and CEO of iVacBio, a vaccine manufacturing startup in South Africa. Dr Gumbi's career spans the technology innovation value chain starting from idea creation to entrepreneur. She presented on the topic; "Building and Leveraging your Innovation Ecosystem".

k. Dr Vincent Okudoh, a Senior Lecturer in Biotechnology at the Cape Peninsula University of Technology (CPUT) in Cape Town, in September presented on the topic; "The potential development of sustainable biogas industry in Botswana: A research perspective". Dr Okudoh has his own Waste2Energy Laboratory.

l. BITRI held a public seminar on 11th February 2020 in Gaborone. The seminar was titled "Nickel Mining Industry: Potential Enabler for Energy Storage". The guest speaker was Dr. V.I. Lakshmanan, Vice-Chair and CEO, Process Research ORTECH Inc. in Ontario, Canada. Dr. Lakshmanan who is also Adjunct Professor at the University of Toronto, is an internationally renowned teacher, scientist and innovator in the area of sustainable development.

Promotion of STEM

m. To contribute towards creating a pool of next generation Scientists, BITRI hosted BIUST third year Mechanical and Energy Engineering students who were taken on a conducted tour of the Solar Thermal Testing Facility. The aim was for them to appreciate it and the services it provides.

n. BITRI hosted one hundred and sixty pupils from Chichi Community Junior Secondary School at its Seding® Solar Street Light assembly plant in Kanye to learn about the operations of the plant. The cohort, principally comprising pupils in the Art and Design and Technology streams, saw a demonstration of how the lights were assembled. They also gained exposure on careers in design and manufacturing.

o. BITRI hosted Boitekanelo College Pharmacy students on a familiarization tour of the Centre for Material Science (CMS) facilities so that they appreciate the resources available and how they can utilize the resources as students and professional scientists in future.

p. To promote STEM and commemorate the International Women's Day (IWD), four BITRI women Scientists from different fields were featured in the Patriot Newspaper talking about their Careers and what they entail. The aim was to encourage the girl child to take up careers in STEM. BITRI also commemorated the International Women's Day (IWD) under the theme 'I Am Generation Equality: Realising Women's Rights' at the organisation's head office at Maranyane House Gaborone. Women staff members from all levels of operations and from all its branches, gathered for the annual event. The guest speaker was Mrs. Ntombi Setshwaelo, a renowned woman advocate.

2. Technology Transfer Office

Departmental Overview

The Technology Transfer Office (TTO) operates under the Department of Research and Partnerships. It consists of the Intellectual Property and Business Development Units. The TTO's key mandate is the commercialization of BITRI invented technologies through effective implementation of, among others, the BITRI institutional Intellectual Property Policy and Innovation Management Framework.

This office facilitates the adoption and uptake of BITRI invented technologies by Small Medium Enterprises (SMEs) and companies for production of BITRI technologies at commercial scale. At the heart of the TTO, its mandate is ensuring that BITRI invented technologies reach all possible end users for improved quality of life.

Commercialization and Technology Transfer

a) BITRI Investment (Pty) Ltd.

In accordance with Article 2.2 (c) of its Constitution BITRI successfully incorporated BITRI Investment (Pty) Ltd as its subsidiary company to oversee the commercialization of all BITRI invented technologies through various pathways ranging from spin-offs, licensing and assignments. The subsidiary will also manage Contract Research and Consultancy Services provided by BITRI.

b) Licensed Technologies

In line with the BITRI institutional Intellectual Property Policy and the Innovation Management framework, BITRI licensed out one technology to a local enterprise this year bringing the total number of technologies licensed out to two.

c) Innovation Support

TTO coordinates the internal management of innovation and research through the Innovation Management Framework (IMF). The Technology Development Committee was established to harmonize the IMF process with Research and Development activities within BITRI. TDC is expected to provide guidance throughout research and development process from ideation to commercialization.

BITRI Departments

INTELLECTUAL PROPERTY MANAGEMENT AND CAPACITY BUILDING.

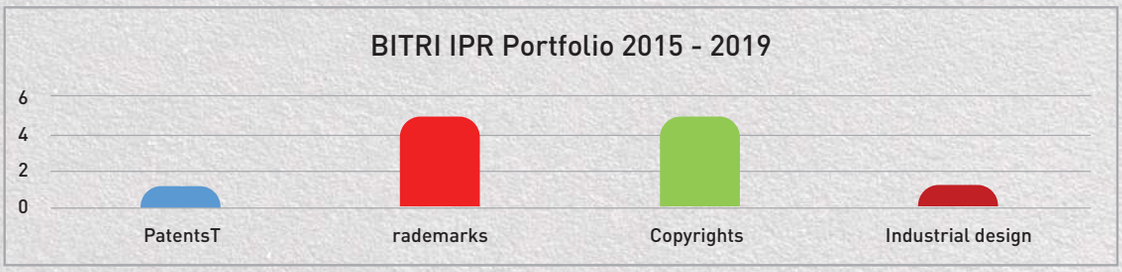
a) Technology and Innovation Support Center (TISC)

BITRI is now part of the Technology and Innovation Support (TISC) network which is made up of several academic and Research and Development institutions in Botswana. The TISC network is a World Intellectual Property Organization (WIPO) supported project meant to spur creativity and innovation by bridging the knowledge gap between developing and developed countries. TISC facilitates access to both patent and non-patent scientific literature for researchers and academics at low costs. For purposes of BITRI, the launch of TISC in Botswana is a welcome and great milestone as it is expected to play a major role towards the identification and adaptation of preexisting technologies to meet the needs of the people of Botswana.

b) Intellectual Property Rights Portfolio

Guided by its institutional Intellectual Property Policy, BITRI has managed to accumulate a few Intellectual Property Rights since inception. Currently, the intellectual property rights portfolio of BITRI stands at one patent, five trademarks, one industrial design and several copyright works in the form of computer programs authored by the Information and Science Technology Research Unit.

Table 1



c) Capacity building on Intellectual Property

In response to the Botswana National Research Science and Technology (BNRST) Plan of 2005 and the National Research, Science, Technology and Innovation (NRST) Policy of 2011 statements, BITRI is actively building capacity in the area of intellectual property courtesy of the World Intellectual Property Organization (WIPO). Apart from promoting Intellectual Property Knowledge and its application, the focus is to build capacity on Patent Drafting and Patent Information Search and Analysis as these crucial skills are in serious shortage in Botswana. This year alone, twenty-four (24) employees completed various WIPO Academy courses. Twenty (20) BITRI employees completed the General Course on Intellectual Property and at least one employee successfully completed the following advanced courses; Advanced courses of the Basics of Patent drafting, Copyright and Related Rights and Trademarks and Industrial Designs.

BITRI Departments

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

BITRI Industry linkages

As a Research and Development institution, BITRI continues to build linkages with the industry and other stakeholders towards the realization of its philosophy - Technology Solutions From You To Us For You" and its strategic intent - #1640 explained earlier in this report.

In partnership with the Local Enterprises Authority (LEA), the Technology Transfer Office conducted four Technology Transfer Forums for SMEs in Gaborone, Selibe Phikwe, Ghanzi and Kanye. The forums overarching objectives were to sensitize SMEs about technology transfer at BITRI, available technologies for uptake as well as the means and modes through which BITRI transfers its invented technologies.

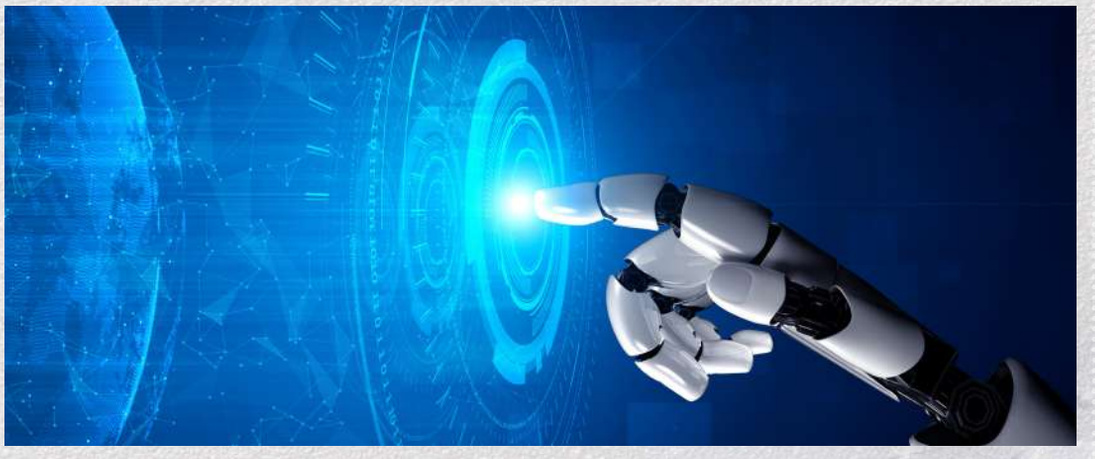
Linkages were also established with other industries for effective utilization of the BITRI state of the art laboratories being the Center for Material Science (CMS) and the Building Materials (BMS) Laboratories. Both laboratories can be used for material analysis and quality assurance by the industry.

Strategic Agreements

BITRI is actively building strategic partnerships with like minded stakeholders to deliver on its mandate. As of 31 April 2019, BITRI had 20 active Memoranda of Understanding, three Memoranda of Agreement, and five active Collaborative Research Agreements. This is in line with the value BITRI attaches to collaboration and co-creation

Staff Complement

The Technology Transfer Office is supervised by Director Research and Partnerships and has a staff complement of two officers responsible for business development and intellectual property management.



BITRI Departments

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

HUMAN CAPITAL DEPARTMENT

Mission

The Human Capital Department exists to develop and deliver innovative human capital programs and services designed to support the mandate of BITRI to position it as a high performing organisation and an employer of choice.

Vision

To enable and inspire all employees to reach their full potential
The human capital is mandated to perform the following two functions:

- Manage, direct, coordinate and supervise the provision of human resource management and development services for BITRI to enable the organisation to implement the overall corporate strategy.

- Lead the provision of cost-effective office support services through the Office Support Division.

Recruitment of Talent

BITRI continued to use competency-based interviews and in some instances psychometric assessments to recruit employees that display the requisite BITRI values and competent to deliver on the BITRI mandate. All vacant positions continued to be advertised internally and externally, always ensuring that our adverts were clear on what was required of applicants to join BITRI both in terms of qualifications, experience, skills and competences. It continued to be difficult to recruit for some research positions especially at Researcher and Senior Researcher levels due to non-availability of qualified applicants in the relevant specialized areas. It ought to be noted that due to the high aspirations to be a cutting-edge research institution, the minimum qualification for all Researcher positions at BITRI is a Doctor of Philosophy, and these are not easy to find in most specialized areas of research. It is of necessity that BITRI recruit the requisite talent if it is to attain the mandate that the organisation was established to undertake, and to be able to compete with any research institution locally, regionally and internationally. BITRI requires to have the creme of the researchers in the country housed at it to undertake applied research, not only blue-sky research. BITRI during the period under review had a total staff complement of 170 employees. More researchers require to be recruited considering the areas of research that have been identified.

BITRI Departments

BITRI DEPARTMENTS, FUNCTIONS & PROJECTS STATUS AT GLANCE (CONT)

Investment in Developing People

BITRI's priority is to invest in developing its staff. Whereas there was no budget for long term training, a Training Plan was developed for the performance year 2019/2020. This is a plan through which employees were to attend different short-term training interventions and workshops targeted at enhancing their skills and competencies. Notwithstanding that there was no budget for long term training, BITRI was able to continue with the intent to develop employees such as at Associate Researchers by utilizing project related funds for them to undertake training at Masters and PhD levels by pursuing studies related to projects that they were undertaking at BITRI. BITRI has also continued to support employees undertaking self-sponsored studies by advancing them study loans and allowing them time off to study and sit for their examinations.

It is imperative that BITRI supports a culture of learning considering the aspiration of the organization to be a cutting-edge science and technology research institution. BITRI aspires to be a high-performing research institute, and it is therefore imperative that it is populated by the best of breed researchers capable of exploring new frontiers of knowledge and able to undertake research of the highest standards. Such researchers also do require to be supported by the best support staff who can create an enabling environment for such research in pursuit of exploration of new knowledge to be undertaken. Training and development remains a critical ingredient in the process.

On Boarding of Staff

The Induction Policy has been developed and adopted by BITRI. All new employees continue to be inducted in line with the Induction Programme. BITRI ensures that all newly appointed staff receive appropriate induction, initial training and the necessary support to quickly acclimatize to the BITRI culture of doing business and to meet early job demands. The on boarding process is necessary to facilitate the transition of new employees into the working environment and to enable them to respond effectively to new responsibilities. New employees joining the organisation are extensively briefed about BITRI, orientated and socialised into BITRI's culture and values, and how BITRI operates.

Staff Welfare

During the financial year 2019/2020 BITRI continued with the existing staff welfare programmes that include 100% medical aid, group life assurance, free gym facilities, bank loan schemes at preferential interest rates and funeral scheme. BITRI continued to recognize the Botswana Public Employees Union (BOPEU) as the bargaining agent for BITRI eligible members of staff. BITRI continued to engage with the Union on matters that are of interest to staff and as required by the Collective Labour Agreement entered into between BITRI and the Union. BITRI has endeavored to nurture the relationship with the Union as a legitimate staff representative and a vanguard for employee rights and welfare. Salary adjustments for the financial year 2019/2020 were as a result rigorously negotiated with the Union and an agreement reached in August 2019. BITRI is committed to building a positive relationship with the Union that will ensure that all engagements between the two parties are in good faith and that they serve the interests of both parties involved.

BITRI Departments

Office Support

The Human Capital Department also ensured that there was provision of cost-effective office support services so that there was a conducive environment for employees to deliver on their mandate. These services included equitable office allocation, provision of office furniture, fleet management, allocation of habitable institutional housing, provision of outsourced security and cleaning services for BITRI. Office Support therefore continued to play a critical role of ensuring that employees are provided with amenities that make them able to work. Provision of security for all BITRI properties and cleaning services to the required highest of standards are essential to the operations of the organization. Security and cleaning remained outsourced services and Office Support has continued to monitor the performance of these services and through open tendering, new service providers were secured during this period.

Terms and Conditions of Employment

The BITRI Terms and Conditions of Employment continued to be enforced to ensure good corporate governance around the organisation. The objective of the BITRI Terms and Conditions of Employment is to clearly state the rights and obligations of BITRI towards its employees, and those of its employees towards BITRI, and thereby minimising disputes and grievances arising out of the Terms and Conditions of Employment and promoting harmonious relations between BITRI and its employees. Together with other human capital policies that have been developed, the BITRI Terms and Conditions of Employment aim to ensure uniformity and consistency throughout BITRI, increase understanding of BITRI's employment practices, eliminating situations where personal decisions are made. They ensure that there is impartiality in how employees are treated across the business. BITRI ensured that employees strictly adhered to a code of ethical business conduct. All employment contracts are governed by the elaborate Terms and Conditions of Employment which amongst other things prohibits any corrupt behaviour, accepting substantial gifts and money laundering. BITRI continued empowering employees to engage in ethical business practices, whilst living their personal values as the organisation believes that the success of its business is basically linked to the success of its employees.

Retention of Staff

BITRI holds that retention of staff is the extent to which BITRI can attain employee's free choice to maintain a relationship and stay with the organisation because they voluntarily wish to invest themselves in BITRI. The aim of the Botswana Institute for Technology Research and Innovation (BITRI) Retention Policy is to support an overall culture that seeks to retain employees by focusing on key/critical positions and key/critical talent within the organisation as identified through the Talent Management and Succession Planning Processes. Such positions invariably include those that are at most risk of being vacant for a long time as they are difficult to fill once incumbents leave. BITRI has over the years lost employees to competition and it is always regrettable when BITRI loses key or critical talent.

BITRI Departments

BITRI will continue to make all necessary and affordable measures to retain talent, and these include dynamic and inspiring leadership, appropriate amount of decision-making authority and therefore empowering employees, reputation of the organisation, challenging work, competitive guaranteed packages and benefits, salary increases linked to performance, performance incentives, mentoring/coaching programmes, learning and development opportunities, achievement of personal goals, employee well-being and work-life balance.

BITRI upholds employee rights as enshrined in the different Botswana Labour legislations. BITRI pursues employment practices which are designed to attract, retain and develop talent to ensure that it retains employees who are highly motivated. The Executive Management in conjunction with the Human Capital Department takes responsibility for employment matters and has established suitable policies and guidelines, which will be reviewed as and when necessary to ensure that BITRI has the best and affordable human capital practices. It is critical to a research institute like BITRI to attract and retain the cream of researchers available both within the country and from the regional and international market.

Performance Management System

BITRI continued to implement the Performance Management System (PMS) across the business and there has been marked improvement in acceptance of the performance management system across the business. Pockets of resistance that initially existed have been reduced with employees getting to appreciate the performance management system as a way of ensuring objectivity in the management of performance by bringing the aspect of measurement in the whole process. The implementation of the performance management system is critical if BITRI is to attain the aspiration to be a high-performing organisation. Through the collective bargaining process, employee performance was rewarded by way of an across the board inflationary salary adjustment and performance related rewards. Measures will continue to be put in place to entrench the performance management system.

Achievements

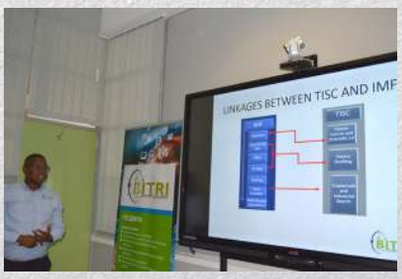
BITRI has been able to maintain a total staff complement of around 168 employees. There was marked appreciation of the performance management system compared to earlier resistance levels. There was also harmonious labour relations resulting in the bargaining process for salaries being concluded even though late during the month of August 2019.

Challenges

Challenges faced during the period continued to include shortage of highly skilled human capital in specialised areas at Researcher and Senior Researcher levels. There has also been challenges with securing the required residence and work permits in the process of recruiting or renewing contracts of employment for expatriate employees. Budgetary constraints were experienced as there been challenges in securing funds for provision of adequate resources required such as transport and meeting the escalating costs of services such as electricity due to equipment that has been procured across the organization. The increase in laboratories and the associated research equipment has had an exponential increase in consumption of utilities such as electricity especially at Head Office where most of the research equipment has been installed.

BITRI Departments

BITRI Departments



BITRI Financials

GENERAL INFORMATION

Botswana Institute for Technology Research and Innovation (BITRI) is a research and development entity whose primary role is to research and develop in focused areas of national interest, deliver high standard technology solutions that maximize the beneficiation of local resources through both institutional and collaborative programs and effectively and affordably address current and anticipated needs for sustainable socio-economic development.

CHIEF EXECUTIVE OFFICER	REGISTERED OFFICE	BANKERS
Prof. Shedden Masupe	Maranyane House Plot 50654 Machel Drive Gaborone	Absa Bank Botswana Limited First National Bank Botswana Limited
	COMPANY SECRETARY	**INDEPENDENT AUDITOR**
	Ms Keamogetse Molefhe	Ernst & Young P. O. Box 41015 Gaborone

MEMBERS OF THE BOARD	DESIGNATION	APPOINTED
Prof. Sasae Mpuchane	(Board Chairperson)	Appointed 01 June 2017
Mr. Oganeditse Marata	(Board Member)	Appointed 01 June 2016
Mr. Baitshepi Tebogo	(Board Member)	Appointed 01 June 2016
Dr. Ronald Tshelametse	(Board Member)	Appointed 01 June 2017
Dr. Force Tefo Manson Thema	(Board Member)	Appointed 01 August 2018
Ms Lesego Thamae	(Board Member)	Appointed 01 August 2018
Dr. Sebusi Odisitse	(Board Member)	Appointed 01 August 2018
Dr. Poloko Keemenao Kebaabetswe	(Board Member)	Appointed 01 August 2018
Dr. Ontiretse Madisa Mine	(Board Member)	Appointed 01 December 2018

BITRI Financials

FINANCE AND OPERATIONS

The Finance and Operations Department ensures the efficiency to support the organization as a whole to focus on its core business and thus attain its targets through the provision of finance and administrative services. Includes development and execution of the organizations' budget; maintenance of official accounting records and procurement of and contracting for goods and services. It is made up of Finance, Facilities and cafeteria.

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BITRI Financials

DIRECTORS' RESPONSIBILITY STATEMENT

The Directors are responsible for the preparation and fair presentation of the financial statements of Botswana Institute for Technology Research and Innovation ("BITRI"), comprising the statement of financial position as at 31 March 2020, and the statements of comprehensive income, changes in funds and cash flows for the year then ended, and the notes to the financial statements, which include a summary of significant accounting policies and other explanatory notes in accordance with International Financial Reporting Standards ("IFRS").

The Directors are required to maintain adequate accounting records and are responsible for the content and integrity of and related financial information included in this report. It is their responsibility to ensure that the financial statements fairly present the state of affairs of BITRI as at the end of the financial year and the results of its operations and cash flows for the year that ended, in conformity with IFRS. The independent auditors are engaged to express an independent opinion on the financial statements and their unmodified opinion as presented on pages 4 to 5.

The Directors are responsible for the preparation and fair presentation of these financial statements in accordance with IFRS and for such internal control as the Directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

The financial statements are prepared in accordance with IFRS and are based upon appropriate accounting policies consistently applied and supported by reasonable and prudent judgments and estimates. The Directors' responsibility also includes maintaining adequate accounting records and an effective system of risk management.

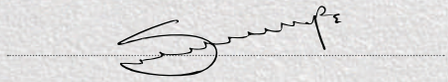
The Directors acknowledge that they are ultimately responsible for the system of internal financial control established by BITRI and place considerable importance on maintaining a strong control environment. To enable the directors to meet these responsibilities, the board of directors sets standards for internal control aimed at reducing the risk of error or loss in a cost effective manner. The standards include the proper delegation of responsibilities within a clearly defined framework, effective accounting procedures and adequate segregation of duties to ensure an acceptable level of risk. These controls are monitored throughout BITRI and all employees are required to maintain the highest ethical standards in ensuring BITRI's business is conducted in a manner that in all reasonable circumstances is above reproach. The focus of risk management in BITRI is on identifying, assessing, managing and monitoring all known forms of risk across BITRI. While operating risk cannot be fully eliminated, BITRI endeavours to minimise it by ensuring that appropriate infrastructure, controls, systems and ethical behaviour are applied and managed within predetermined procedures and constraints.

The Directors have made an assessment of BITRI's ability to continue as a going concern as well as the impact of Covid 19 and there is no reason to believe the organisation will not be a going concern in the year ahead.

The Directors are of the opinion, based on the information and explanations given by management, that the system of internal control provides reasonable assurance that the financial records may be relied on for the preparation of the financial statements. However, any system of internal financial control can provide only reasonable, and not absolute, assurance against material misstatement or loss.

Directors' Approval of The Financial Statements

The financial statements set out on pages 59 to 83, which have been prepared on the going concern basis, were approved by the Board of Directors on 16 November 2020 and are signed on its behalf by:



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Independent Auditor's Report
To the Board of Directors of Botswana Institute for Technology Research and Innovation

Report on the Audit of the Financial Statements

Opinion
We have audited the financial statements of Botswana Institute for Technology Research and Innovation set out on pages 6 to 30 which comprise the statement of financial position as at 31 March 2020 and the statement of comprehensive income, statement of changes in reserves and statement of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the financial statements give a true and fair view of the financial position of Botswana Institute for Technology Research and Innovation as at 31 March 2020 and its financial performance and cash flows for the year then ended in accordance with International Financial Reporting Standards and the requirements of the Companies Act Cap 42:01.

Basis of Opinion
We conducted our audit in accordance with International Standards on Auditing (ISAs). Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the Company in accordance with the International Ethics Standards Board for Accountants' Code of Ethics for Professional Accountants (IESBA Code) and other independence requirements applicable to performing the audit of Botswana Institute for Technology Research and Innovation. We have fulfilled our other ethical responsibilities in accordance with the IESBA Code, and in accordance with other ethical requirements applicable to performing the audit of Botswana Institute for Technology Research and Innovation. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Key Audit Matters
Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the financial statements of the current period. We have determined that there are no such matters to report.

Other Information
The Board of Directors is responsible for the other information. The other information comprises the Board of Director's Responsibility Statement and approval of financial statements. The other information does not include the financial statements and our auditor's report thereon.
Our opinion on the financial statements does not cover the other information and we do not express an audit opinion or any form of assurance conclusion thereon.
In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or our knowledge obtained in the audit, or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of the Board of Director's for the Financial Statements
The Board of Directors is responsible for the preparation and fair presentation of the financial statements in accordance with International Financial Reporting Standards and the requirements of the Companies Act Cap 42:01, and for such internal control as the Board of Directors determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Board of Directors is responsible for assessing the company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the goin

Resident Partner: B Ndwapi (Managing Partner)
A full list of Partners is available from the office
and the Register of Companies
Independent member of Ernst & Young Global Limited

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concern basis of accounting unless the Board of Directors either intend to liquidate the company or to cease operations or have no realistic alternative but to do so.
Those charged with governance are responsible for overseeing the company's financial reporting processes.

Auditor's Responsibilities for the Audit of the Financial Statements
Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with ISAs, we exercise professional judgement and maintain professional scepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the company's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Board of Directors.

- Conclude on the appropriateness of the Board of Directors' use of the going concern basis of accounting and based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the company's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the company to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with the Board of Directors regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

30/11/2020

Ernst & Young
Practising member: Bakani Ndwapi
Partner
Membership number: 19980026
Certified Auditor
Gaborone

BITRI Financials

STATEMENT OF COMPREHENSIVE INCOME FOR THE YEAR ENDED 31 MARCH 2020

	Notes	2020 P	2019 P
INCOME			
Revenue Grant	2	107,634,936	106,871,458
Interest Income	3	3,206,167	1,408,082
Other Income	4	5,329,077	4,448,250
Total Income		116,170,180	112,727,790
EXPENSES			
Staff Costs		68,703,278	68,183,403
Other Operating Costs		42,812,002	44,942,062
Total Expenses		111,515,280	113,125,465
(Deficit)/Surplus For The Year		**4,654,900**	**(397,675)**
Other Comprehensive Income For The Year		-	-
Total Comprehensive Income For The Year		**4,654,900**	**(397,675)**

BITRI Financials

STATEMENT OF FINANCIAL POSITION AS AT 31 MARCH 2020

	Notes	2020 P	2019 P
Assets			
Non-Current Assets			
Property, Plant And Equipment	7	194,849,677	205,467,274
Right Of Use Asset	19	238,664	-
		195,088,341	205,467,274
Current Assets			
Inventories	8	17,840,784	19,152,408
Trade And Other Receivables	9	1,764,970	2,168,147
Cash And Cash Equivalents	10	104,997,643	146,736,746
		124,603,397	168,057,301
Total Assets		**319,691,738**	**373,524,575**
Funds And Liabilities			
Funds			
Accumulated Surplus		10,981,504	6,326,604
Non-Current Liabilities			
Capital Grant	11	125,551,173	134,185,413
Deferred Revenue Grant	12	68,005,167	69,481,194
Lease Liabilities	19	56,153	-
		193,612,493	203,666,607
Current Liabilities			
Deferred Revenue Grant	12	1,532,000	1,800,669
Project Funds	13	96,453,556	121,097,113
Trade And Other Payables	14	6,298,967	26,598,054
Provisions	15	10,610,630	14,035,528
Lease Liabilities	19	202,588	-
		115,097,741	163,531,364
Total Funds And Liabilities		**319,691,738**	**373,524,575**

STATEMENT OF CHANGES IN FUNDS FOR THE YEAR ENDED 31 MARCH 2020

	Accumulated Surplus P
Balance as at 1 April 2018	**6,724,279**
Total Comprehensive deficit for the year	(397,675)
Balance as at 31 March 2019	**6,326,604**
Total Comprehensive income for the year	4,654,900
Balance as at 31 March 2020	**10,981,504**

STATEMENT OF CASH FLOWS FOR THE YEAR ENDED 31 MARCH 2020

	2020 P	2019 P
CASH FLOWS FROM OPERATING ACTIVITIES		
Surplus/(Deficit) for the year	4,654,900	(397,675)
Adjustment for:		
Depreciation of property, plant and equipment & right of use asset	18,085,456	17,321,989
Interest received	(3,206,167)	(1,408,082)
Cash inflow/(outflow) from operations before working capital changes	19,534,189	15,516,232
(Increase)/Decrease in inventories	1,311,624	(8,609,481)
(Increase)/Decrease in trade and other receivables	403,177	(699,048)
Increase/(Decrease) in trade and other payables	(20,299,087)	22,237,597
Increase/(Decrease) in provisions	(3,424,898)	2,620,164
Increase/(Decrease) in capital grants	(8,634,240)	21,902,008
Increase/(Decrease) in the deferred revenue grant	(1,744,696)	280,109
Increase/(Decrease) in project funds	(24,643,558)	72,398,232
Net cash utilised in operating activities	(37,497,489)	125,645,813
CASH FLOWS FROM INVESTING ACTIVITIES		
Interest received	3,206,167	1,408,082
Purchase of property, plant and equipment	(7,878,931)	(39,588,305)
Proceeds from disposal of property, plant and equipment	615,644	84,214
Net cash used in investing activities	(4,057,120)	(38,096,009)
CASH FLOWS FROM FINANCING ACTIVITIES		
Payment of lease liabilities - Right of use asset	(219,543)	-
Interest charge for lease liabilities - Right of use asset	35,049	-
Net cash used in financing activities	(184,494)	-
NET INCREASE/(DECREASE) IN CASH AND CASH EQUIVALENTS	(41,739,103)	87,549,803
CASH AND CASH EQUIVALENTS AT BEGINNING OF YEAR	146,736,746	59,186,943
CASH AND CASH EQUIVALENTS AT END OF YEAR	**104,997,643**	**146,736,746**
Represented by:		
Cash at Bank	104,994,644	146,733,747
Cash on hand	2,999	2,999
	104,997,643	146,736,746

BITRI Financials

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020

BASIS OF PREPARATION

The financial statements of BITRI have been prepared in accordance with the International Financial Reporting Standards ("IFRS"). The financial statements have been prepared under the historical cost convention with the exception of certain assets and liabilities at fair value through profit or loss.

Items included in these financial statements are measured using the currency that best reflects the primary economic environment in which BITRI operates - the functional currency.

The financial statements are presented in Botswana Pula, which is the BITRI's functional and presentation currency.

The preparation of the financial statements is in conformity with the IFRS, which requires the use of certain critical accounting estimates and judgments concerning the future. Estimates and judgments are continually evaluated and are based on historical factors coupled with expectations about future events that are considered reasonable. The estimation is based on management's best judgment. There are no areas of estimation or judgment that have a significant risk of causing material adjustments to the carrying amounts of assets and liabilities in the current year.

NEW/REVISED INTERNATIONAL FINANCIAL REPORTING STANDARDS

New and revised Standards and Interpretations effective & adopted in the current year

At the date of authorisation of these financial statements, the following Standards and

Interpretations, which are applicable to BITRI were adopted during the year:

New/Revised International Financial Reporting Standards	Effective Date
IFRS 16 (New) Leases	January 2019

SUMMARY OF PRINCIPAL ACCOUNTING POLICIES

The principal accounting policies adopted are set out below and are consistent, in all material respects, with those adopted in the previous year.

CASH AND CASH EQUIVALENTS

Cash and cash equivalents are carried in the statement of financial position at cost. For the purposes of the cash flow statement cash and cash equivalents comprise of cash on hand and demand deposits, and other highly liquid investments that are readily convertible to a known amount of cash and are subject to an insignificant risk of changes in value.

GOVERNMENT GRANTS

Government grants are not recognised until there is reasonable assurance that BITRI will comply with conditions attaching to them and that the grants will be received.

Government grants whose primary condition is that BITRI should purchase, construct or otherwise acquire non-current assets are recognised as capital grants in the statement of financial position and transferred to profit or loss on a systematic and rational basis over the useful lives of related assets.

Government grants are recognised as revenue over the periods necessary to match them with the costs for which they are intended to compensate, on a systematic basis.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020 (CONTINUED)

GOVERNMENT GRANTS (CONTINUED)

Government grants that are receivable as compensation for expenses or losses already incurred or for the purpose of giving immediate financial support to BITRI with no future related costs are recognised in profit or loss in the period in which they become receivable.

REVENUE RECOGNITION

IFRS 15 Accounting Policy and Disclosure effective for periods beginning 1 April 2018

Adoption of IFRS 15: Revenue from Contracts with Customers

IFRS 15 replaced the previous revenue recognition guidance, including IAS 18 Revenue, IAS 11 Construction Contracts and IFRIC 13 Customer Loyalty Programs. The Institute adopted IAS 18 in the periods prior 1 April 2018.

In the prior periods, interest from short-term deposits and investments was recognized on a time-proportion basis using the effective interest approach. Revenue from services was exclusive of Value Added Tax (VAT) and discounts granted and was recognised in the statement of comprehensive income when the service had been rendered and the following conditions had been satisfied:

a) The amount of revenue could be measured reliably;
b) The stage of completion of the transaction at the statement of financial position date could be measured reliably;
c) It was probable that the economic benefits associated with the transaction will flow to BITRI.

Revenue from fees charged for services was based on the stage of provision of service determined with reference to the services performed by the end of the year. When a receivable was impaired, BITRI reduced the carrying amount to its recoverable amount.

With the introduction of IFRS 15 - Revenue from Contracts with Customers which became effective from 1 January 2018, the Institute adopted the standard effective from 1 April 2018.

IFRS 15 introduces a five-step approach to revenue recognition. Far more prescriptive guidance has been added to deal with specific scenarios. Apart from providing more extensive disclosures on the Institute's revenue transactions, the application of IFRS 15 had no significant impact on the financial position and/or financial performance of the Institute.

Accounting Policies for Revenue

Revenue is measured based on the consideration to which the Institute expects to be entitled in a contract with a customer and excludes amounts collected on behalf of third parties.

Revenue recognition follows a five step model framework as follows:

Step1: Identify the contract(s) with a customer
Step 2: Identify the performance obligations in the contract
Step 3: Determine the transaction price
Step 4: Allocate the transaction price to the performance obligations in the contract
Step 5: Recognise revenue when (or as) the entity satisfies a performance obligation

Interest income - Interest from short term deposits and investments is recognised on a time-proportion basis using the effective interest approach. Revenue from services is exclusive of Value Added Tax ("VAT") and discounts granted and is recognised in the statement of comprehensive income.

Fees and other income - Fees and other income are recognised in the accounting period in which they accrue.

BITRI Financials

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020 (CONTINUED)

PLANT AND EQUIPMENT

Plant and equipment is stated at cost less accumulated depreciation and accumulated impairment losses except for buildings, which were donated to the Institute, which were capitalised at their valuation amount in 2014. An equivalent amount was recognised in the deferred revenue grant.

The cost of an item of plant and equipment is recognised as an asset when it is probable that future economic benefits associated with the item will flow to BITRI and the cost of the item can be measured reliably.

Costs include costs incurred initially to acquire or construct an item of plant and equipment and costs incurred subsequently to add to the asset. If a replacement cost is recognised in the carrying amount of an item of plant and equipment, the carrying amount of the replaced part is derecognised.

Depreciation is charged so as to write off the depreciable value of the assets over their estimated useful lives down to their residual values, using the straight-line method. The estimated useful lives, residual values and depreciation methods are reviewed at each year end, with the effect of any changes in estimate accounted for on a prospective basis.

The following methods were used during the year to depreciate plant and equipment to estimated residual values:

Buildings	2%
Laboratory equipment	10%
Furniture and fittings	14%
Office equipment	14%
Motor vehicles	20%
Computer equipment	25%
Cell phones	50%
Plant and machinery	10%

An asset's carrying amount is written down immediately to its recoverable amount if the asset's carrying amount is greater than its estimated recoverable amount.

Gains and losses on disposals are determined by comparing proceeds with the carrying amount and are recognised within 'Other Income' in the statement of comprehensive income.

All assets except buildings and software are allocated 5% residual values.

EMPLOYEE RETIREMENT BENEFITS

BITRI's employees are engaged on a contract basis and they are entitled to their gratuities at the time preferable to them i.e. monthly, annually or at the end of their contracts. This decision was taken by the Board of Directors at its sitting of the 26 June 2015 where it was resolved that employees be allowed to choose how they prefer to have their gratuity paid over the tenure of their contracts of employment.

Employee entitlements to annual leave, gratuities, bonuses, medical aid, housing benefits, kilometre allowances, telephone allowances, retention allowances and severance benefits are recognised when they accrue to employees and an accrual is made for the estimated liability as a result of services rendered by the employee up to the statement of financial position date. Provision is made in respect of these benefits on an annual basis and included in the operating results.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020 (CONTINUED)

FOREIGN CURRENCY TRANSLATIONS

In preparing the financial statements, transactions in currencies other than the BITRI's functional currency (foreign currencies) are recognised at the rates of exchange prevailing at the dates of the transactions. At the end of each reporting period, monetary items denominated in foreign currencies are retranslated at the rates prevailing at that date. Non-monetary items carried at fair value that are denominated in foreign currencies are retranslated at the rates prevailing at the date when the fair value was determined. Non-monetary items that are measured in terms of historical cost in a foreign currency are not retranslated.

Foreign exchange gains and losses resulting from the settlement of foreign currency transactions and from the translation of monetary assets and liabilities denominated in foreign currencies are recognised in the statement of comprehensive income.

TRADE AND OTHER RECEIVABLES

Trade receivables are amounts due from procuring entities for services performed by BITRI in the ordinary course of operation. If collection is expected in one year or less (or in the normal operating cycle of the operation if longer), they are classified as current assets. If not, they are presented as non-current assets. Other receivables include advances made to employees.

Trade and other receivables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method, less provision for impairment.

A provision for impairment of trade receivables is established when there is objective evidence that BITRI will not be able to collect all amounts due according to the original terms of receivables. Significant financial difficulties of the debtor, probability that the debtor will enter bankruptcy or financial reorganisation, and default or delinquency in payments (more than 30 days overdue) are considered indicators that the trade receivable is impaired.

The amount of the provision is the difference between the carrying amount and the present value of estimated future cash flows, discounted at the original effective interest rate. The carrying amount of the asset is reduced through the use of an allowable account, and the amount of the loss is recognised in the statement of comprehensive income within 'administration expenses'. When a trade receivable is uncollectable, it is written off against the allowable account for trade receivables. Subsequent recoveries of the amounts previously written off are credited against 'administration expenses' in the statement of comprehensive income.

PROJECT FUNDS

Project funds relate to funding received for specific projects. These are deferred and included in current liabilities as projects funds. The related expenditure is netted off against the project funds received. Over expenditure which is not recoverable from the donors is recognised as expenditure in the profit or loss of the Institute.

IMPAIRMENT OF ASSETS

At the end of each reporting period BITRI reviews the carrying amount of its assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any). Where it is not possible to estimate the recoverable amount of an individual asset, BITRI estimates the recoverable amount of the cash-generating unit to which the asset belongs.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020 (CONTINUED)

IMPAIRMENT OF ASSETS (CONTINUED)

Where an impairment loss subsequently reverses, the carrying amount of the asset (cash-generating-unit) is increased to the revised estimate of its recoverable amount. This is done so that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognised in prior years. A reversal of an impairment loss is recognised in the statement of comprehensive income.

PROVISIONS

Provisions are recognised when BITRI has a present legal or constructive obligation as a result of past events; it is probable that an outflow of resources will be required to settle the obligation, and the amount has been reliably estimated. Provisions are not recognised for future operating losses.

Where there are a number of similar obligations, the likelihood that an outflow will be required in settlement is determined by considering the class of obligations as a whole. A provision is recognised even if the likelihood of an outflow with respect to any one item included in the same class of obligations may be small.

Provisions are measured at the present value of the expenditures expected to be required to settle the obligation using a pre-tax rate that reflects the current market assessments of the time value of money and the risks specific to the obligation. The increase in the provision due to passage of time is recognised as interest expense.

TRADE PAYABLES

Trade payables are recognised initially at fair value and subsequently measured at amortised cost using the effective interest method. The effective interest method is as described below under 'Financial Instruments'.

LEASES

IFRS 16 - Leases is a new standard which replaces IAS 17 Leases, and introduces a single lessee accounting model. The company has applied IFRS 16 using the modified retrospective approach and therefore the comparative information has not been restated and continues to be reported under IAS 17. The details of accounting policies under IAS17 and are disclosed separately if they are different from those under IFRS 16.

The main changes arising from the issue of IFRS 16 which have an impact on the Institute are as follows:

The Institute as a lessee:

Lessees are required to recognise a right-of-use asset and a lease liability for all leases, except short term leases or leases where the underlying asset has a low value, which are expensed on a straight line or other systematic basis.

The cost of the right-of-use asset includes, where appropriate, the initial amount of the lease liability; lease payments made prior to commencement of the lease less incentives received; initial direct costs of the lessee; and an estimate for any provision for dismantling, restoration and removal related to the underlying asset.

The lease liability takes into consideration, where appropriate, fixed and variable lease payments; residual value guarantees to be made by the lessee; exercise price of purchase options; and payments of penalties for terminating the lease.

The right-of-use asset is subsequently measured on the cost model at cost less accumulated depreciation and impairment and adjusted for any re-measurement of the lease liability. However, right-of-use assets are measured at fair value when they meet the definition of investment property and all other investment property is accounted for on the fair value model. If a right-of-use asset relates to a class of property, plant and equipment which is measured on the revaluation model, then that right-of-use asset may be measured on the revaluation model.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020 (CONTINUED)

LEASES (CONTINUED)

- The lease liability is subsequently increased by interest, reduced by lease payments and re-measured for reassessments or modifications.
- Re-measurements of lease liabilities are effected against right-of-use assets, unless the assets have been reduced to nil, in which case further adjustments are recognised in profit or loss.
- The lease liability is re-measured by discounting revised payments at a revised rate when there is a change in the lease term or a change in the assessment of an option to purchase the underlying asset.
- The lease liability is re-measured by discounting revised lease payments at the original discount rate when there is a change in the amounts expected to be paid in a residual value guarantee or when there is a change in future payments because of a change in index or rate used to determine those payments.
- Certain lease modifications are accounted for as separate leases. When lease modifications which decrease the scope of the lease are not required to be accounted for as separate leases, then the lessee re-measures the lease liability by decreasing the carrying amount of the right of lease asset to reflect the full or partial termination of the lease. Any gain or loss relating to the full or partial termination of the lease is recognised in profit or loss. For all other lease modifications which are not required to be accounted for as separate leases, the lessee re-measures the lease liability by making a corresponding adjustment to the right-of-use asset.
- Right-of-use assets and lease liabilities should be presented separately from other assets and liabilities. If not, then the line item in which they are included must be disclosed. This does not apply to right-of-use assets meeting the definition of investment property which must be presented within investment property. IFRS 16 contains different disclosure requirements compared to IAS 17 leases.

The Institute as a lessor:

- Accounting for leases by lessors remains similar to the provisions of IAS 17 in that leases are classified as either finance leases or operating leases. Lease classification is reassessed only if there has been a modification.
- A modification is required to be accounted for as a separate lease if it both increases the scope of the lease by adding the right to use one or more underlying assets; and the increase in consideration is commensurate to the stand alone price of the increase in scope.
- If a finance lease is modified, and the modification would not qualify as a separate lease, but the lease would have been an operating lease if the modification was in effect from inception, then the modification is accounted for as a separate lease. In addition, the carrying amount of the underlying asset shall be measured as the net investment in the lease immediately before the effective date of the modification. IFRS 9 is applied to all other modifications not required to be treated as a separate lease.
- Modifications to operating leases are required to be accounted for as new leases from the effective date of the modification. Changes have also been made to the disclosure requirements of leases in the lessor's financial statements.

Sale and leaseback transactions:

- In the event of a sale and leaseback transaction, the requirements of IFRS 15 are applied to consider whether a performance obligation is satisfied to determine whether the transfer of the asset is accounted for as the sale of an asset.
- If the transfer meets the requirements to be recognised as a sale, the seller-lessee must measure the new Right-of-Use asset at the proportion of the previous carrying amount of the asset that relates to the right-of-use retained.
- The buyer-lessor accounts for the purchase by applying applicable standards and for the lease by applying IFRS 16
- If the fair value of consideration for the sale is not equal to the fair value of the asset, then IFRS 16 requires adjustments to be made to the sale proceeds.

BITRI Financials

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020 (CONTINUED)

Sale & leaseback transactions (cont.)

When the transfer of the asset is not a sale, then the seller-lessee continues to recognise the transferred asset and recognises a financial liability equal to the transfer proceeds. The buyer-lessor recognises a financial asset equal to the amounts paid to the seller-lessee in accordance with IFRS 9. From the perspective of the buyer-lessor, this arrangement is a financing transaction.

BORROWINGS

Interest-bearing bank loans and overdrafts are recorded at the proceeds received, net of direct transaction costs. Finance charges, including amortisation of direct transaction costs, are charged to the statement of comprehensive income using the effective interest rate method. Tranches of borrowings and overdrafts which mature on a regular basis are classified as current or non-current liabilities based on the maturity of the facility so long as the committed facility exceeds the drawn debt.

INVENTORIES

Inventories are stated at the lower of cost and net realisable value. Cost is determined using the weighted average costing method.

FINANCIAL RISK MANAGEMENT

BITRI's activities expose it to various financial risks, which under the review period have been analysed, evaluated, accepted as tolerable; and hence no derivative instruments have been used to hedge the financial risks. BITRI's aim is to achieve an appropriate balance between risk and return and minimise potential adverse effects on BITRI's financial performance.

BITRI's risk management policies are designed to identify and analyse these risks, to set appropriate risk limits and controls, and to monitor the risks and adherence to limits by means of reliable and up-to-date information systems. BITRI regularly reviews its risk management policies and systems to reflect changes in markets, products and emerging best practice.

FINANCIAL INSTRUMENTS

The adoption of IFRS 9 has resulted in changes in our accounting policies for recognition, classification and measurement of financial assets and impairment of financial assets. Set out below are disclosures relating to the impact of adoption of IFRS 9 on the Institute:

Measurement methods

Amortised cost and effective interest rate

The amortised cost is the amount at which the financial asset or financial liability is measured at initial recognition minus the principal repayments, plus or minus the cumulative amortisation using the effective interest method of any difference between that initial amount and the maturity amount and, for financial assets, adjusted for any loss allowance.

The effective interest rate is the rate that exactly discounts estimated future cash payments or receipts through the expected life of the financial asset or financial liability to the gross carrying amount of a financial asset (i.e. its amortised cost before any impairment allowance) or to the amortised cost of a financial liability. The calculation does not consider expected credit losses and includes transaction costs, premiums or discounts and fees and points paid or received that are integral to the effective interest rate, such as origination fees.

When BITRI revises the estimates of future cash flows, the carrying amount of the respective financial assets or financial liability is adjusted to reflect the new estimate discounted using the original effective interest rate. Any changes are recognised in profit or loss.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020 (CONTINUED)

FINANCIAL INSTRUMENTS (CONTINUED)

Initial recognition and measurement

Financial assets and financial liabilities are recognised when the entity becomes a party to the contractual provisions of the instrument. At initial recognition, BITRI measures a financial asset or financial liability at its fair value plus or minus, in the case of a financial asset or financial liability not at fair value through profit or loss, transaction costs that are incremental and directly attributable to the acquisition or issue of the financial asset or financial liability, such as fees and commissions. Transaction costs of financial assets and financial liabilities carried at fair value through profit or loss are expensed in profit or loss. Immediately after initial recognition, an expected credit loss allowance (ECL) is recognised for financial assets measured at amortised cost which results in an accounting loss being recognised in profit or loss when an asset is newly originated.

When the fair value of financial assets and liabilities differs from the transaction price on initial recognition, BITRI recognises the difference as follows:

(a) When the fair value is evidenced by a quoted price in an active market for an identical asset or liability (i.e. a Level 1 input) or based on a valuation technique that uses only data from observable markets, the difference is recognised as a gain or loss.

(b) In all other cases, the difference is deferred and the timing of recognition of deferred day one profit or loss is determined individually. It is either amortised over the life of the instrument, deferred until the instrument's fair value can be determined using market observable inputs, or realised through settlement.

Financial assets

Classification and subsequent measurement

From 1 January 2018, BITRI has applied IFRS 9 and classifies its financial assets at amortised cost. The classification requirements for debt measured at amortised cost are described below:

Debt instruments

Debt instruments are those instruments that meet the definition of a financial liability from the issuer's perspective, such as loans, government and corporate bonds and trade receivables purchased from clients in factoring arrangements without recourse.
Classification and subsequent measurement of debt instruments depend on:

(i) BITRI's business model for managing the asset; and
(ii) the cash flow characteristics of the asset.

Based on these factors, BITRI classifies its debt instruments as amortised cost as follows:

Amortised cost: Assets that are held for collection of contractual cash flows where those cash flows represent solely payments of principal and interest ('SPPI'), and that are not designated at FVPL, are measured at amortised cost. The carrying amount of these assets is adjusted by any expected credit loss allowance recognised and measured using the simplified expected loss model. Interest income from these financial assets is included in 'Interest and similar income' using the effective interest rate method.

BITRI reclassifies debt investments when and only when its business model for managing those assets changes. The reclassification takes place from the start of the first reporting period following the change. Such changes are expected to be very infrequent and none occurred during the period.

BITRI Financials

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020 (CONTINUED)

FINANCIAL INSTRUMENTS (CONTINUED)

Cash and Cash Equivalent

Cash and cash equivalent comprise cash on hand, 6demand deposits and short-term, highly liquid investments readily convertible to cash and subject to insignificant risk of loss of value. Cash and cash equivalent are measured at amortised cost.

Impairment of financial assets

BITRI recognises a loss allowance for expected credit losses (ECL) on investments in debt instruments that are measured at amortised cost which include lease receivables, trade receivables and contract assets. The amount of expected credit losses is updated at each reporting date to reflect changes in credit risk since initial recognition of the respective financial instrument. BITRI considers debt that is 90 days past due to be in default consistent with the presumption in the basis for conclusion to IFRS 9.

BITRI always recognises lifetime ECL for trade receivables, contract assets and lease receivables. The expected credit losses on these financial assets are estimated using simplified ECL model based on the provision matrix. The ECL model takes into account the Institute's historical credit loss experience, adjusted for factors that are specific to the debtors, general economic conditions and an assessment of both the current as well as the forecast direction of conditions at the reporting date. Lifetime ECL represents the expected credit losses that will result from all possible default events over the expected life of a financial instrument.

Derecognition of financial assets

BITRI derecognises a financial asset only when the contractual rights to the cash flows from the asset expire, or when it transfers the financial asset and substantially all the risks and rewards of ownership of the asset to another entity. If BITRI neither transfers nor retains substantially all the risks and rewards of ownership and continues to control the transferred asset, BITRI recognises its retained interest in the asset and an associated liability for amounts it may have to pay. On derecognition of a financial asset measured at amortised cost, the difference between the asset's carrying amount and the sum of the consideration received and receivable is recognised in profit or loss.

Financial liabilities

All financial liabilities are measured subsequently at amortised cost using the effective interest method. The effective interest method is a method of calculating the amortised cost of a financial liability and of allocating interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments (including all fees and points paid or received that form an integral part of the effective interest rate, transaction costs and other premiums or discounts) through the expected life of the financial liability, or (where appropriate) a shorter period, to the amortised cost of a financial liability.
Derecognition of financial liabilities

BITRI derecognises financial liabilities when, and only when, BITRI's obligations are discharged, cancelled or have expired. The difference between the carrying amount of the financial liability derecognised and the consideration paid and payable is recognised in profit or loss.

SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES, JUDGEMENTS AND ESTIMATES 31 MARCH 2020 (CONTINUED)

CRITICAL ACCOUNTING ESTIMATES AND JUDGEMENTS

The preparation of financial statements in conformity with IFRS requires the use of certain critical accounting estimates. It also requires management to exercise its judgment in the process of applying BITRI's accounting policies. Contracts with customers often include promises to deliver multiple services. Determining whether such bundled services are considered i) distinct performance obligations that should be separately recognized, or ii) non-distinct and therefore should be combined with another good or service and recognized as a combined unit of accounting may require significant judgment. In general, the Institute's services are capable of being distinct as they could be performed by other educational institutions and do not involve significant customization. These areas involving a higher degree of judgment or complexity, or areas where assumptions and estimates are significant to BITRI's financial statements are disclosed.

Measurement of the expected credit loss allowance

The measurement of the expected credit loss allowance for financial assets measured at amortised cost is an area that requires the use of complex models and significant assumptions about future economic conditions and credit behavior (e.g. the likelihood of customers defaulting and the resulting losses).
A number of significant judgements are also required in applying the accounting requirements for measuring ECL, such as:
Choosing appropriate models and assumptions for the measurement of ECL;

- Establishing Institute's of similar financial assets for the purposes of measuring ECL.
- Estimates and judgments are continually evaluated based on historical experience and other factors, including expectations of events that are believed to be reasonable under the circumstances.

The estimates and underlying assumptions are reviewed on an on-going basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period, or in the period of the revision and future periods if the revision affects both current and future periods.

Key sources of estimation uncertainty

The most significant estimates and assumptions made in the preparation of these financial statements are as follows:

- the calculation of bad debts provision;
- the assessment of impairments and the calculation of the recoverable amount of assets;
- the determination of useful lives and residual values of items of plant and equipment; and
- the calculation of any provision for guarantees, claims, litigation and other legal matters.

BITRI Financials

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020

1 NATURE OF BUSINESS

Botswana Institute for Technology Research and Innovation is an entity with a registration number CO2012/8667. The primary objective is to conduct needs based research and development in focused areas of national interest and deliver high standard technology solutions that maximise the beneficiation of local resources through both institutional and collaborative programmes.

2 REVENUE GRANT

	2020 P	2019 P
Grants received	89,549,480	89,549,480
Transfer from Deferred revenue grant (note 12)	1,744,696	1,779,891
Amortisation of Capital, Recurrent & ROU grants (Note 11)	16,340,760	15,542,087
	107,634,936	**106,871,458**

3 INTEREST INCOME

Bank deposits		
	3,206,167	1,408,082

4 OTHER INCOME

Sundry income	517,109	287,098
Rental income	1,272,419	1,109,277
Profit on sale of Seding Lights	3,539,549	3,051,875
	5,329,077	**4,448,250**

5 (DEFICIT)/SURPLUS FOR THE YEAR

In addition to the amounts disclosed in Notes 1, 2, 3 and 4 above, the (deficit)/surplus for the year is stated after taking into account the following:

Auditors' remuneration		
- current provision	270,000	270,000
Depreciation of property, plant and equipment	17,880,886	17,321,989
Key management's remuneration	7,004,796	6,525,814

6 TAXATION

Under the provisions of the Income Tax Act (Chapter 52:01) Second Schedule, the Institute is exempt from income tax"

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020 (CONTINUED)

7 PROPERTY, PLANT AND EQUIPMENT

COST	Land & Buildings P	Plant and Machinery P	Computers and Software P	Furniture & Fittings P	Laboratory Equipment	Motor Vehicles P	Total P
At 1 April 2018	82,510,571	3,664,722	16,187,658	6,287,461	99,838,705	6,363,105	214,852,225
Additions	2,344,062	1,157,855	2,109,030	929,131	32,546,577	501,644	39,588,298
Disposals			(561,565)				(561,565)
At 31 March 2019	84,854,633	4,822,577	17,735,124	7,216,592	132,385,282	6,864,749	253,878,958
Additions		396,691	2,044,107	564,633	4,420,370	453,130	7,878,931
Disposals			(960,421)		(366,499)	-	(1,326,920)
At 31 March 2020	84,854,633	5,219,268	18,818,810	7,781,225	136,439,153	7,317,879	260,430,968
ACCUMULATED DEPRECIATION							
At 31 March 2018	5,282,668	894,522	7,858,725	1,691,838	13,304,928	2,534,373	31,567,054
Charge during the year	1,732,077	399,162	3,454,121	971,963	9,482,114	1,282,543	17,321,980
Disposals			(477,351)				(477,351)
At 31 March 2019	7,014,745	1,293,684	10,835,495	2,663,801	22,787,042	3,816,916	48,411,683
Charge during the year	1,746,884	482,668	2,584,539	1,020,357	10,809,425	1,237,011	17,880,886
Disposal			(711,276)				(711,276)
At 31 March 2020	8,761,629	1,776,352	12,708,758	3,684,158	33,596,467	5,053,927	65,581,291
Net book value							
31 March 2018	77,227,903	2,770,200	8,328,933	4,595,623	86,533,777	3,828,731	183,285,167
Net book value							
31 March 2019	77,839,888	3,528,893	6,899,628	4,552,792	109,598,240	3,047,833	205,467,274
Net book value							
31 March 2020	76,093,004	3,442,916	6,110,052	4,097,067	102,842,686	2,263,952	194,849,677

The original buildings, which were donated to the Institute, were capitalised at their valuation in 2014. An equivalent amount was recognised in the deferred revenue grant reserve.

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020

8. INVENTORIES	2020 P	2019 P
Work in progress	17,840,784	9,152,408

Work in progress relates to the Seding Lights project which had not been completed at year end. No inventories are encumbered or pledged as security.

9 TRADE AND OTHER RECEIVABLES		
Trade receivables	303,764	584,494
Less: Provision for bad & doubtful debts	(113,596)	-
	190,168	584,494
Staff advances	81,140	56,171
Prepayments	1,028,322	800,390
Other receivables	465,340	727,092
	1,764,970	2,168,147

10 CASH AND CASH EQUIVALENTS		
Call account	22,496,544	95,329,820
Fixed deposit	82,569,684	51,376,164
Current account	(54,610)	(16,000)
Credit card account	(16,974)	43,763
Petty cash	2,999	2,999
	104,997,643	146,736,746

11 CAPITAL GRANT		
(a) Recurrent & Development		
Balance at beginning of year	134,185,413	112,283,405
Addition to property, plant & equipment	7,878,931	37,528,309
Amortisation of capital grant - depreciation of property, plant and equipment - Capital & Recurrent grants	(16,136,190)	(15,542,087)
Net book value of disposed property, plant and equipment	(615,644)	(84,214)
Balance at end of year	125,312,509	134,185,413
(b) Right of Use Asset		
Balance at beginning of year		
Addition to property, plant & equipment - Right of use asset	443,234	-
Amortisation of capital grant - Right of use asset	(204,570)	-
Balance at end of year	238,664	-

12 DEFERRED REVENUE GRANTS		
Balance at beginning of year	71,281,863	71,001,754
Revenue grants received during the year	-	2,060,000
Transfer to statement of comprehensive income (note 2)	(1,744,696)	(1,779,891)
Balance at end of year	69,537,167	71,281,863
Current	1,532,000	1,800,669
Non-Current	68,005,167	69,481,194
	69,537,167	71,281,863

The deferred revenue arises as a result of the residential and commercial properties and motor vehicles which were received from the Government of Botswana in December 2014. The current portion is the amount to be amortised to the income statement in the next financial year.

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020 (CONTINUED)

ANALYSIS OF MOVEMENT IN PROJECT FUNDS ACCOUNT FOR THE YEAR

PROJECT FUNDS 13 2020	1 April 2019 P	Income P	Transfer to capital grant P	Transfer to capital Work in progress P	Operating Expenditure P	Transfer to other projects P	Transfer from WIP P	Transfer to income Statement P	31 March 2020
HQ Building	991,818	-	-	-	(176,102)	-	-	-	815,716
Laboratory Equipment	3,375,458	5,300,000	(782,373)	(1,394,567)	(849,118)	-	-	-	5,649,400
Satellite Offices set up									
(ICT Associates Programme)	(681,790)	2,480,000	(26,580)	-	(4,488,600)	-	-	-	(2,716,970)
KSBB	6,637,198	-	(443,234)	(747,776)	(10,552,693)	-	-	-	(5,106,505)
Climate Change	2,104,785	-	(55,440)	-	(837,557)	-	-	-	1,211,788
Coal to Liquid	195,466	3,500,000	(1,418,108)	-	(927,486)	-	-	-	1,349,872
Seding lights	50,307,937	5,335,000	(306,325)	-	(10,902,804)	-	-	(3,539,549)	40,894,259
Science in Society Project	28	-	-	-	-	-	-	-	28
Water Filtration	12,518	830,000	(19,662)	(10,752)	(173,485)	-	-	-	638,619
Diagnostics	544,456	2,000,000	(556,538)	-	(447,576)	-	-	-	1,540,342
Air filtration	650,117	200,000	(118,319)	-	(246,642)	-	-	-	485,156
Television white space(TVWS)	101,336	-	(123,514)	-	(83,949)	-	-	-	(106,127)
Design Equipment/Design & Prototyping	2,253,848		-	-	(474,167)	-	-	-	1,999,681
Energy Management	(349,299)	-	-	-	(21,484)	-	-	-	(370,783)
Renewable Energy Technologies	3,440,820	-	(1,162,678)	-	(491,216)	-	-	-	1,786,926
Software and Mobile Applications	2,262,123	1,000,000	(350,087)	-	(122,894)	-	-	-	2,789,142
Smart Systems Technologies	1,354,235	500,000	(131,863)	-	(274,637)	-	-	-	1,447,735
Lab Equipment (Building Material Science)	(175,847)		(45,137)	-	(51,625)	-	-	-	(272,609)
IT solutions	9,247,468	800,000	(821,961)	-	(870,000)	-	-	-	8,355,507
Electronic Plant	37,433,783		0	-	(2,832)	-	-	-	37,430,951
Accreditation	208,821		307,774)	-	(314,083)	-	-	-	(413,036)
Clinker	856,583		0	-	(1,933,558)	-	-	-	(1,076,975)
Refectories	305,431		(154,394)	-	(6,660)	-	-	-	144,377
Tackling Infections to Benefit Africa (TIBA)	19,820	592,843	(2,564)	-	(633,038)	-	-	-	(22,939)
	-	-	-	-	-	-	-	-	-
	121,097,114	**22,757,843**	**(6,826,551)**	**(2,153,095)**	**(34,882,206)**	**-**	**-**	**(3,539,549)**	**96,453,556**

BITRI Financials

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020 (CONTINUED)

ANALYSIS OF MOVEMENT IN PROJECT FUNDS ACCOUNT FOR THE YEAR

PROJECT FUNDS 13 2020	1 April 2019 P	Income P	Transfer to capital grant P	Transfer to capital Work in progress P	Operating Expenditure P	Transfer to other projects P	Transfer from WIP P	Transfer to income Statement P	31 March 2020
HQ Building	2,404,113	-	(614,102)	-	(948,256)	-	150,063	-	991,818
Laboratory Equipment	(3,978,636)	8,147,520	(317,914)	-	(475,512)	-	-	-	3,375,458
Satellite Offices set up	1,273,162	3,600,000	(135,853)	-	(5,419,099)	-	-	-	(681,790)
KSBB	147,076	23,321,300	(237,838)	(1,866,848)	(14,815,933)	-	89,441		6,637,198
Climate Change	1,861,481	1,250,000	-		(1,006,696)	-	-	-	2,104,785
Coal to Liquid	(4,144,361)	5,644,361	(581,930)	-	(722,604)	-	-	-	195,466
Seding lights	45,765,621	20,029,654	(1,624,652)	-	(9,310,811)	(1,500,000)	-	(3,051,875)	50,307,937
Science in Society Project	28	0		-		-	-	-	28
Water Filtration	(203,601)	1,078,601	(349,293)	-	(513,189)	-	-	-	12,518
Diagnostics	407,387	3,000,000	(1,112,377)	-	(1,750,554)	-	-	-	544,456
Air filtration	471,940	500,000	(39,726)	-	(407,286)	-	125,189	-	650,117
Television white space(TVWS)	743,306		-		(641,970)	-	-	-	101,336
Design Equipment/Design & Prototyping	1,018,514	2,349,499	(528,581)	-	(585,584)	-	-	-	2,253,848
Energy Management	744,644	500,000	(1,064,200)	-	(29,743)	(500,000)	-	-	(349,299)
Renewable Energy Technologies	2,555,424	4,500,000	(6,786,945)	-	(1,318,338)	2,000,000	2,490,679	-	3,440,820
Software and Mobile Applications	(713,990)	4,013,989	(285,708)	-	(752,168)	-	-	-	2,262,123
Smart Systems Technologies	(3,320,936)	4,727,038	-	-	(51,867)	-	-	-	1,354,235
Lab Equipment (Building Material Science)	(94,796)	-	(56,537)	-	(24,514)	-	-	-	(175,847)
IT solutions	3,762,504	6,500,000	(424,296)	-	(590,740)	-	-	-	9,247,468
Electronic Plant	-	60,000,000	(21,679,858)	-	(886,359)	-	-	-	37,433,783
Accreditation	-		525,000	-	(316,179)	-	-	-	208,821
Clinker	-	2,603,700	(375,061)	-	(1,372,056)	-	-	-	856,583
Refectories	-	550,000	(244,569)	-		-	-	-	305,431
Tackling Infections to Benefit Africa (TIBA)	-	19,820		-		-	-	-	19,820
	48,698,881	**152,860,481**	**(36,459,440)**	**-**	**(1,866,848)**	**(41,939,458)**	**2,855,372**	**(3,051,875)**	**121,097,113**

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020 (CONTINUED)

ANALYSIS OF MOVEMENT IN PROJECT FUNDS ACCOUNT FOR THE YEAR

PROJECT FUNDS 13 2020	1 April 2019 P	Income P	Transfer to capital grant P	Transfer to capital Work in progress P	Operating Expenditure P	Transfer to other projects P	Transfer from WIP P	Transfer to income Statement	31 March 2020 P
HQ Building	991,818	-	-	-	(176,102)	-	-	-	815,716
Laboratory Equipment	3,375,458	5,300,000	(782,373)	(1,394,567)	(849,118)	-	-	-	5,649,400
Satellite Offices set up (ICT Associates Programme)	(681,790)	2,480,000	(26,580)	-	(4,488,600)	-	-	-	(2,716,970)
KSBB	6,637,198	-	(443,234)	(747,776)	(10,552,693)	-	-	-	(5,106,505)
Climate Change	2,104,785	-	(55,440)	-	(837,557)	-	-	-	1,211,788
Coal to Liquid	195,466	3,500,000	(1,418,108)	-	(927,486)	-	-	-	1,349,872
Seding lights	50,307,937	5,335,000	(306,325)	-	(10,902,804)	-	-	(3,539,549)	40,894,259
Science in Society Project	28	-	-	-	-	-	-	-	28
Water Filtration	12,518	830,000	(19,662)	(10,752)	(173,485)	-	-	-	638,619
Diagnostics	544,456	2,000,000	(556,538)	-	(447,576)	-	-	-	1,540,342
Air filtration	650,117	200,000	(118,319)	-	(246,642)	-	-	-	485,156
Television white space(TVWS)	101,336	-	(123,514)	-	(83,949)	-	-	-	(106,127)
Design Equipment/Design & Prototyping	2,253,848	220,000	-	-	(474,167)	-	-	-	1,999,681
Energy Management	(349,299)	-	-	-	(21,484)	-	-	-	(370,783)
Renewable Energy Technologies	3,440,820	-	(1,162,678)	-	(491,216)	-	-	-	1,786,926
Software and Mobile Applications	2,262,123	1,000,000	(350,087)	-	(122,894)	-	-	-	2,789,142
Smart Systems Technologies	1,354,235	500,000	(131,863)	-	(274,637)	-	-	-	1,447,735
Lab Equipment (Building Material Science)	(175,847)	-	(45,137)	-	(51,625)	-	-	-	(272,609)
IT solutions	9,247,468	800,000	(821,961)	-	(870,000)	-	-	-	8,355,507
Electronic Plant	37,433,783	-	-	-	(2,832)	-	-	-	37,430,951
Accreditation	208,821	-	(307,774)	-	(314,083)	-	-	-	(413,036)
Clinker	856,583	-	-	-	(1,933,558)	-	-	-	(1,076,975)
Refectories	305,431	-	(154,394)	-	(6,660)	-	-	-	144,377
Tackling Infections to Benefit Africa (TIBA)	19,820	592,843	(2,564)	-	(633,038)	-	-	-	(22,939)
	-	-	-	-		-	-	-	-
	121,097,114	**22,757,843**	**(6,826,551)**	**(2,153,095)**	**(34,882,206)**	**-**	**-**	**(3,539,549)**	**96,453,556**

BITRI Financials

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020 (CONTINUED)

13 PROJECT FUNDS (CONTINUED)

Cumulative 2019	Total income P	capital grant P	capital Work in progress P	Capital Expenditure P	Operating Expenditure P	Total Impairment P	Transfer to other projects P	Transfer to Income Statement P	31 March 2019 Balance P
HQ Building	15,600,000	(9,874,367)	-		(4,733,815)	-	-	-	991,818
Laboratory Equipment	86,566,270	(80,290,621)	-	(83,093)	(2,817,098)	-	-	-	3,375,458
Satellite Offices set up (ICT Associates Programme)	24,807,230	(4,810,845)	-	(97,935)	(19,109,585)	-	(1,470,655)	-	(681,790)
KSBB	64,019,457	(3,412,472)	(21,647,355)	(576,721)	(32,024,996)	279,285	-	-	6,637,198
Climate Change	6,541,242	(1,369,622)	-	(25,875)	(3,040,960)	-	-	-	2,104,785
Coal to Liquid	10,768,861	(8,689,579)	-	-	(1,971,400)	87,584	-	-	195,466
Seding Lights	88,493,018	(4,082,689)	-	-	(31,021,172)	-	(29,345)	(3,051,875)	50,307,937
Science in Society Project	515,000	-	-		(514,972)	-	-	-	28
Water Filtration	2,873,601	(693,595)	-	-	(2,167,488)	-	-	-	12,518
Diagnostics	8,956,000	(2,366,970)	-	-	(6,044,574)	-	-	-	544,456
Air filtration	1,495,000	(87,729)	-	-	(757,154)	-	-	-	650,117
Dynamic Spectrum wireless network on television white space (TVWS)	3,001,770	(1,187,236)	-		(1,713,198)	-	-	-	101,336
Design & Prototyping	7,455,499	(3,663,235)	-	-	(1,538,416)	-	-	-	2,253,848
Energy Management	1,625,000	(1,064,200)	-	-	(410,099)	-	(500,000)	-	(349,299)
Renewable Energy Technologies	10,572,250	(7,351,795)	-	-	(1,779,635)	-	2,000,000	-	3,440,820
Software & Mobile Applications	6,691,989	(1,641,388)	-	-	(2,788,478)	-	-	-	2,262,123
Smart Systems Technologies	7,582,038	(4,614,491)	-		(1,613,312)	-	-	-	1,354,235
Laboratory Equipment (KSBB)	1,752,498	(1,903,831)	-	-	(24,514)	-	-	-	(175,847)
IT solutions	11,670,000	(1,336,777)	(383,616)	-	(702,138)	-	-	-	9,247,469
Electronic Plant	60,000,000	(21,679,858)	-	-	(886,359)	-	-	-	37,433,783
Accreditation	525,000	-	-	-	(316,179)	-	-	-	208,821
Clinker	2,603,700	(375,061)	-		(1,372,056)	-	-	-	856,583
Refectories	550,000	(244,569)	-	-	-	-	-	-	305,431
Tackling Infections to Benefit Africa (TIBA)	19,820	-	-	-	-	-	-	-	19,820
	-	-	-	-	-	-	-	-	-
Total Development Grants	**424,685,243**	**(160,740,930)**	**(22,030,971)**	**(783,624)**	**(117,347,598)**	**366,869**	**-**	**(3,051,875)**	**121,097,114**

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020 (CONTINUED)

14 TRADE AND OTHER PAYABLES

	2020 P	2019 P
Trade payables	254,186	24,103,358
Staff accruals	560	560
Other payables and accruals	6,044,221	2,494,136
	6,298,967	26,598,054

15 PROVISIONS

	Leave provision P	Gratuity provision P	Total P
Balance at beginning of year	7,153,938	6,881,590	14,035,528
Additional provision raised	3,212,516	6,909,354	10,121,870
Payments	(4,820,759)	(8,726,009)	(13,546,768)
Balance at end of year	5,545,695	5,064,935	10,610,630

16 FINANCIAL INSTRUMENTS

	2020 P	2019 P
Categories of financial instruments		
Financial assets		
Loans and receivables (including bank balances and cash)	124,522,257	168,001,130
Financial liabilities		
Other financial liabilities	16,909,597	40,633,582
Interest received on loans and receivables	3,206,167	1,408,082

Capital risk management

The capital of the Institute comprises accumulated funds and project funds. Management actively manages capital to ensure that the Institute remains a going concern in the foreseeable future.

Currency risk

The Institute is not exposed to movements in the foreign currency as they have no bank balances in foreign currency nor receivables denominated in foreign currency. There is no active foreign currency risk management process adopted by the Institute mainly because expenditure is incurred in Botswana Pula currency.

Interest rate risk

Financial instruments that are sensitive to interest rate risk are bank balances on call whose interest rates are linked to the prime lending rate. If interest rates were 1% higher while all other variables were held constant the surplus for the year would increase by P1,050,662 (2019: P 1,467,060) opposite effect. At end of the reporting period the following balances were held in call accounts with reputable financial institutions.

	2020 P	2019 P
Interest bearing financial assets	105 066 228	146 705 984

Liquidity risk

The Institute is funded in advance every quarter by the Government of Botswana. The Government of Botswana is committed to this arrangement due to the Institute's national significance.

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020 (CONTINUED)

16 FINANCIAL INSTRUMENTS (CONTINUED)

Credit risk management

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial loss to the Institute. As at 31 March 2020 BITRI's maximum exposure to credit risk which will cause a financial loss due to failure to discharge an obligation by the counterparties arises from the carrying amount of the respective recognised financial assets as stated in the statement of financial position.

In order to minimise credit risk, credit approvals and other monitoring procedures are in place to ensure that follow-up action is taken to recover overdue debts. Furthermore, BITRI reviews the recoverable amount of each trade debt on an individual basis at the end of each month to ensure that adequate loss allowance is made for irrecoverable amounts. In this regard, the directors consider that BITRI's credit risk is significantly reduced. BITRI does not hold any collateral or other credit enhancements to cover its credit risks associated with its financial assets. Financial assets of BITRI, which are subject to credit risk, consist mainly of trade and other receivable and cash resources. BITRI holds cash deposits with reputable financial institutions.

BITRI applies the simplified approach to providing for expected credit losses prescribed by IFRS 9, which permits the use of the lifetime expected loss provision for all short-term receivables. To measure the expected credit losses, short-term receivables have been grouped based on shared credit risk characteristics and the days past due.

17 RELATED PARTY TRANSACTIONS

Remuneration of key management personnel

Key management personnel are individuals with significant influence in the day to day operations of the Institute. The management considers the Chief Executive Officer, Executive Director - Technologies, Executive Director - Natural Resources & Materials, Director - Research & Partnerships, Director - Finance & Operations and Director - Human Capital to be the only members of key management personnel remunerated by the Institute.

	2020 P	2019 P
Short term benefits	7,004,796	6,525,814

18 ANALYSIS OF REVENUE

Recognition of revenue by timing and product	P	P
Performance obligations satisfied over time		
Consultancy Income	337,304	90,893
Performance obligations satisfied at a specific point in time		
Sale of goods – Local	-	-
Sale of goods – Export	-	-
Total	**337,304**	**90,893**

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020 (CONTINUED)

19 LEASES	2020	2019
Right of use asset		
Initial recognition	443,234	-
Depreciation	(204,570)	-
NBV	**238,664**	**-**
Lease Liability		
Initial recognition	443,234	-
Repayments (Lease expense)	(219,542)	-
Interest	35,049	-
Closing balance	**258,741**	**-**
Current	202,588	-
Non-current	56,153	-
Closing balance	**258,741**	**-**

The Institute has a lease of 300 square meters on Plot no. 1097, Nkoyaphiri, Mogoditshane to store KSBB machines. The initial lease ran from 1st January 2019 to 30th June 2020 and has been extended to 30th June 2021. The other lease of 120 square meters on the same plot for a workshop is excluded from the calculation and treated as an operating lease as it ran from 1st January 2019 to 31st August 2019.

20 CONTINGENT LIABILITIES

There are no contingent liabilities in the current financial year.

21 EVENTS AFTER THE REPORTING DATE

Resignations - Board of Directors
The Chairman of the BITRI Board of Directors Prof. Sasae Mpuchane and Director Ronald Tshelametse's term in office expired on the 31 May 2020. The Institute has applied for renewal of their contracts and is awaiting response from the Ministry.

Covid 19

COVID-19 was first diagnosed in Africa in March 2020 just before the BITRI financial year end date of 31 March 2020. The World Health Organization (WHO) declared the Coronavirus (COVID-19) outbreak to be a pandemic on 11 March 2020. Many governments globally took increasingly stringent steps to help contain the spread of the virus. The Botswana Government introduced various measures including extreme social distancing measures to help curb the spread of the virus. As a result of that the country was placed under a nationwide lock-down on 02 April 2020. The results of the Company for the period to 31 March 2020 were largely not affected by the closure of the local economy due to the government COVID-19 response.

In response to the catastrophic effects of the pandemic on lives and business activity, BITRI swiftly formulated and implemented a COVID-19 focused Business Continuity Plan ("BCP"). There has been no significant negative impact on the operations of BITRI as a result of the COVID-19 lockdown for the year ended 31 March 2020.

NOTES TO THE FINANCIAL STATEMENTS 31 MARCH 2020 (CONTINUED)

21 EVENTS AFTER THE REPORTING DATE (CONTINUED)

Covid 19 (Continued)
COVID-19 was first diagnosed in Africa in March 2020 just before the BITRI financial year end date of 31 March 2020. The World Health Organization (WHO) declared the Coronavirus (COVID-19) outbreak to be a pandemic on 11 March 2020. Many governments globally took increasingly stringent steps to help contain the spread of the virus. The Botswana Government introduced various measures including extreme social distancing measures to help curb the spread of the virus. As a result of that the country was placed under a nationwide lock-down on 02 April 2020. The results of the Company for the period to 31 March 2020 were largely not affected by the closure of the local economy due to the government COVID-19 response.

In response to the catastrophic effects of the pandemic on lives and business activity, BITRI swiftly formulated and implemented a COVID-19 focused Business Continuity Plan ("BCP"). There has been no significant negative impact on the operations of BITRI as a result of the COVID-19 lockdown for the year ended 31 March 2020.

The disease has continued spreading globally beyond the BITRI reporting date and the full extent of the health and economic outcomes remain uncertain as the pandemic is an unprecedented challenge for humanity and for the economy globally.

Between the reporting date and the date these financial statements were approved by the BITRI Board, Management concluded that the effect of the pandemic and the measures taken to contain its spread were non-adjusting post-balance sheet events. Management has re-assessed the appropriateness of the use of the going concern assumption in the preparation of these financial statements and is of the view that the significant uncertainty associated with COVID-19 does not cast significant doubt on the Company's immediate ability to continue as a going concern.

Without quantifying, due to the difficulty of doing so, Management has considered the following in its assessment of the impact of COVID-19 on BITRI thus far and prospectively:

Government subvention reduction
In April 2020 the Botswana government reduced the Institute's recurrent subvention from P89.6 million to P79.3 million and development grant from P38.9 million to P35.9 million. There is uncertainty as to whether this would spill into the ensuing years. The Institute is continuing to work with other stakeholders to intensify research and development in national priority areas such as health, education, ICT, energy etc to contribute to the economy of Botswana and also to reduce financial dependency on government.

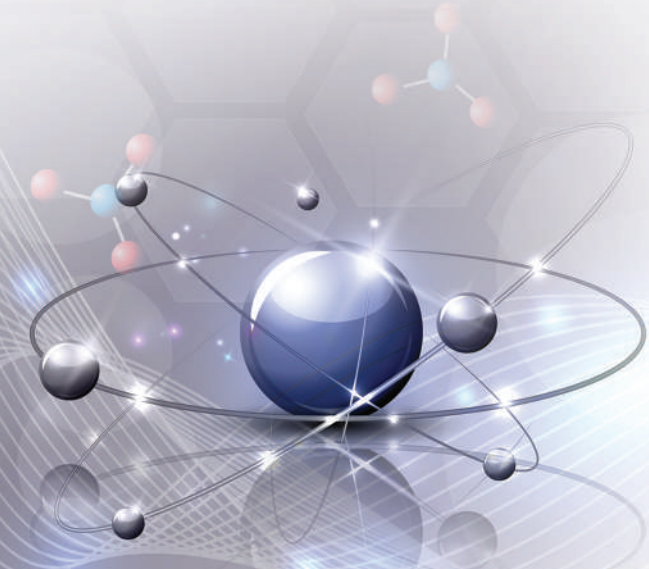
BITRI Financials

DETAILED INCOME STATEMENT FOR THE YEAR ENDED 31 MARCH 2020

INCOME	2020 P	2019 P
Revenue grant	107,634,936	106 871 458
Interest income	3,206,167	1 408 082
Other income	4,056,658	3 338 973
Rental income	1,272,419	1 109 277
	116,170,180	112 727 790
EXPENDITURE		
Advertising	421,020	363 164
Auditor's remuneration - current year provision	270,000	219 510
Bank charges	120,067	132 973
Board fees	285,091	219 051
Cleaning	915,579	899 024
Computer expenses	1,147,695	1 061 235
Consultancy fees	349,322	1 586 079
Depreciation of property, plant and equipment - Operational assets	3,337,181	4 121 079
Depreciation of property, plant and equipment held under capital grant	14,543,705	13 200 910
Depreciation - Right of Use asset	204,570	-
Directors' remuneration (allocation to Institute)	7,004,796	6 525 814
Insurance	1,339,999	1 376 624
Internet rentals and service	869,288	899 795
Legal fees	86,260	260
Miscellaneous expenses	268,478	640 184
Medical aid	2,344,057	2 631 471
Motor vehicle expenses	538,003	417 091
Office refreshments	933,475	858 617
Postage	17,166	33 671
Printing and stationery	364,470	367 750
Recruitment expenses	81,995	54 218
Rent and utilities	2,526,718	2 690 773
Repairs, maintenance and renovations	1,592,836	3 236 086
Security	2,172,176	2 420 248
Social activities	1,412,240	647 978
Staff costs	59,354,425	59 026 118
Subscriptions	1,515,519	1 654 396
Subsistence and per diem	1,794,590	1 459 964
Telephone expenses	931,486	839 765
Training	-	140 551
Travel	1,459,567	1 245 257
Uniform & Protective Clothing	11,263	15 887
Consumables and workshop supplies	782,421	543 831
Workshop and seminars	980,806	2 452 086
Asset Replacement - Recurrent	1,425,420	1 144 002
Bad & doubtful debts	113,596	-
Loss on disposal of property, plant and equipment	-	-
	111,515,280	113,125,465
OPERATING (DEFICIT)/SURPLUS FOR THE YEAR	4,654,900	(397 675)

BITRI Financials

2019/2020 annual report



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