

ANNUAL REPORT 2022

NATIONAL INSTITUTE OF POST-HARVEST MANAGEMENT

Research and Development Centre
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National Institute Of Post Harvest Management
Jayanthi Mawatha
Anuradhapura.

Hon. Minister of Agriculture
Ministry of Agriculture
No 85/5, "Govijana Mandiraya"
Rajamalwatta Lane
Battaramulla

Hon Minister,

ANNUAL REPORT – 2022

In terms of section 14(2) of the Finance Act No 38 of 1971, we wish to submit Annual Report and Statement of Accounts of National Institute Of Post Harvest Management , for the year 2022.

Your faithfully



Prof. W.A.P Weerakkody

Chairman

National Institute Of Post Harvest Management

ACT AND LEGISLATIONS

The National Institute of Post-Harvest Management (Institute of Post-Harvest Technology) functioning under the purview of Ministry of Agriculture established on 19th June 2000 by the Extraordinary Gazette of the Democratic Socialist Republic of Sri Lanka No. 1137/10 for the purpose of carrying out post-harvest research and development on all agricultural crops. The newly established institute has taken over the functions of the Rice Processing Research and Development Centre (RPRDC) of the Paddy Marketing Board at Anuradhapura, which was set up with FAO/UNDP assistance in 1976. The new Institute has been assigned the functions and responsibilities for carrying out post-harvest research and development on not only rice and grains but also on other field crops, vegetables, fruits, spice crops and cut flowers. The name of the institute was changed as National Institute of Post-Harvest Management by the Extraordinary Gazette, 2093/26 of the Democratic Socialist Republic of Sri Lanka on 27.10.2018

MANDATE

According to the mandate given in the gazette notification, The National Institute of Post-Harvest Management is supposed to serve as the coordinating body to bring together all agencies concerned for the purpose of identifying and prioritizing the research needs and implementation of programs for the development of the postharvest technology in Sri Lanka.

VISION

To be the center of excellence in sustainable postharvest development for national food security

MISSION

Sustainable development of national food security through efficient and effective postharvest technological interventions to strengthen the supply and value chains of the agricultural produce and products with high quality and safe food, to cater to the domestic and export markets at competitive price.

BOARD OF MANAGEMENT

As at 31st December 2022

Chairman

Prof. W.A.P. Weerakkody

Vice Chairman

Mr. W.M. Manjula Hiroshana

Members

Dr. S.H.S. Ajantha De Silva

Mrs. S.A. Sriyani

Mr. Mr. Sarathchandra De Silva

Mr. I. Mansoor

Prof. K.S.P. Amarathunga

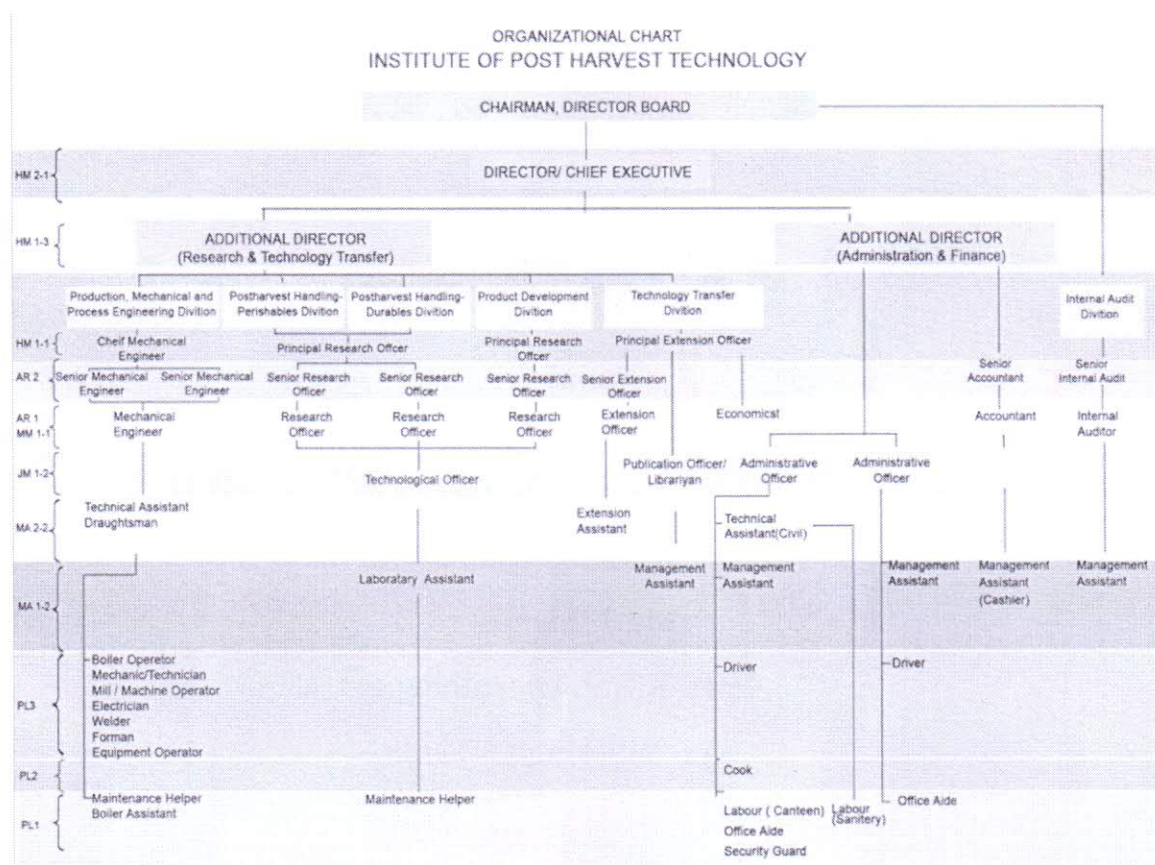
Rm. Wijesinghe Banda

Secretary to the Board

Eng. Mr. H.M.A.P. Rathnayake

ORGANIZATION STRUCTURE

Organization Structure as per the Scheme of Recruitment (SOR) approved



Institute has re-structured its divisions in 2018 as follows. (Currently, the total cadre and the organizational structure is being re-structured).

1. Research division
2. Engineering division
3. Technology Transfer division
4. Project Management division
5. Laboratory Service division
6. Planning and Monitoring division
7. Administration division
8. Finance division
9. Academic division
10. Internal Audit Unit

SENIOR MANAGEMENT

As at 31st December 2022

DIRECTOR/CHIEF EXECUTIVE OFFICER (Acting)

Eng. H.M.A.P. Rathnayake

ADDITIONAL DIRECTOR (RESEARCH AND TECHNOLOGY TRANSFER)

Eng. H.M.A.P. Rathnayake

ADDITIONAL DIRECTOR (ADMINISTRATION AND FINANCE)

Mr. R.K.A.P. Ramanayake

RESEARCH DIVISION

Dr. (Mrs.) R.M.N.A Wijewardhane
HOD | Principal Research Officer

ENGINEERING DIVISION

Eng. B.D.M.P. Bandara
HOD | Senior Mechanical Engineer

TECHNOLOGY TRANSFER DIVISION

Mr. W.M.C.B. Wasala
HOD (Acting) | Principal Research Officer

PROJECT MANAGEMENT DIVISION

Mr. W.M.C.B. Wasala
HOD | Principal Research Officer

LABORATORY SERVICE DIVISION

Mr. C.R. Gunawardhane
HOD | Senior Research Officer

PLANNING AND MONITORING DIVISION

Dr. (Mrs.) R.M.R.N.K. Ratnayake
HOD | Senior Research Officer

ACADEMIC DIVISION

Dr. (Mrs.) D.M.S.P. Bandara (Jan.-Sep.)
Mrs. C.K. Marasinghe (Sep.-December)
HOD | Senior Mechanical Engineer

ADMINISTRATION DIVISION

Mr. R.K.A.P. Ramanayake
HOD | Additional Director (Admin & Finance)

INTERNAL AUDIT DIVISION

Mr. R.M.D. Rathnayake
HOD | Internal Auditor

FINANCE DIVISION

Mr. I.M.N.P. Illangasinghe
HOD | Accountant

MANAGEMENT COMMITTEES

As at 31st December 2022

AUDIT AND MANAGEMENT COMMITTEE

Name	Position
Mrs. T.Y.L.Munasinghe	Chairman from 08-04-2022 to 24.11.2022
Mr.R.M Wijesinghe Banda	Chairman from 25.11.2022 to 31.12.2022
Mr. I. Mansoor	Member
Mr. S. Sarathchandra De Siva	Member
Eng. H.M.A.P. Rathnayake	Secretary
Mr. R.M.D. Rathnayake	Convenor
Mr. W.M.Ranmandala	Observer
Mrs. H.I.Nilmini	Observer

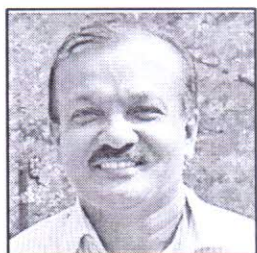
RESEARCH ADVISORY COMMITTEE

Name	Position and Place
Dr. Ajantha De Silva	Additional Secretary, Agriculture Technology Division, Ministry of Agriculture.
Prof. S.B Nawarathna	Senior Lecturer, Faculty of applied science, University of Sri Jayawardanepura.
Prof. Rohitha Prasantha	Senior Lecturer, Faculty of Agriculture, University of Peradeniya.
Prof. J.W. Damunupola	Senior Lecturer, Faculty of Science, University of Peradeniya.
Prof. B.M.L.D.P. Suriyagoda,	Senior Lecturer, Faculty of Agriculture, University of Peradeniya.
Prof. Sanath Amarathunge	Senior Lecturer, Faculty of Agriculture, University of Peradeniya.
Ms. Nilamani Yapa	Senior Lecturer, Faculty of Applied Science, Rajarata University of Sri Lanka.
Mr. Haridas Fernando,	Group General Manager (Agri business). Cargils Ceylon PLC.
Prof. K.H. Sarananda	Senior Lecturer (Faculty of Agriculture & Plantation Management, Wayamba University of Sri Lanka)
Dr. S.D.G.S.P. Gunawardana	Senior Lecturer , Faculty of Engineering University of Peradeniya

RESEARCH RELEASING COMMITTEE

Name	Position
Dr. (Mrs.) R.M.N.A. Wijewardana	Chairman
Mrs.G.D.N.Manike	Secretary
Mr. W.M.C.B.Wasala	Member
Mr. B.D.M.P. Bandara	Member
Dr.(Mrs.) R.M.R.N.K.Ratnayake	Member

CHAIRMAN'S MESSAGE



The National Institute of Postharvest Management (former the Institute of Post-Harvest Technology – IPHT-), operating under the Ministry of Agriculture, covers up

all areas of postharvest sector with the goal of enhancing food security in the country. IPHT was established on 19th June 2000 by the Extraordinary Gazette of the Democratic Socialist Republic of Sri Lanka No. 1137/10 under the provisions of the State Agricultural Corporations Act. No. 11 of 1972 for the purpose of carrying out postharvest research and development activities pertaining to cereals, pulses, oil seeds, other field crops, fruits, vegetables, spice crops and ornamental plants. The name of the institute was changed as National Institute of Post-Harvest Management by the Extraordinary Gazette, 2093/26 of the Democratic Socialist Republic of Sri Lanka on 27.10.2018.

The year 2022 was an extremely difficult and very challenging year for the institute, since we had to complete all the research and developmental activities amidst the economic constraint and fuel shortage in the country that had badly affected the farming practices of many commercial cropping systems, affecting the programs of the NIPHM. However, with the aim of ensuring national food security, the institute was able to conduct 18 state funded research projects. And also, 06 development projects were initiated although they were not continued after the second quarter of the year due to the circulars issued by the government as per the measures adopted by the government to overcome the economic crisis.

All these projects addressed the key issues of supply and value chains of economically important agricultural commodities. Research projects mainly focused on developing technologies to minimize postharvest losses through improving supply and value chains of

agricultural crops by addressing the existing gaps at critical loss points.

Regarding the developmental activities, proper post-harvest practices of rice, grain legumes, fruits, vegetables and spice crops were introduced to the supply chains especially through training and awareness programmes. Thus the institute was able to promote 52 new agri-based entrepreneurs. Since the methods of transportation have been identified as the key points in minimization of postharvest losses, both in quantity and quality, follow-up activities of the development project-2021, 'Introduction of safe packages for handling and transportation of fruits and vegetables', was continued in the year 2022 too.

Improved Laboratory services played a significant role as a commercial entity by providing nearly 400 reports after analyzing them. Consultancy services to establish and to improve the rice mills and other processing sectors were another key area of the institute thus 20 consultancy services were given to the stakeholders.

Finally, with the success of these activities, reduction of postharvest losses is expected and it would lead to create a marked impact on agriculture of the country while uplifting the nation.

Based on the experience gathered during the year of 2022, I am confident that the institute would be able to improve the postharvest industry in the coming years.

Prof. W.A.P. Weerakkody
Chairman

YEAR AT A GLANCE

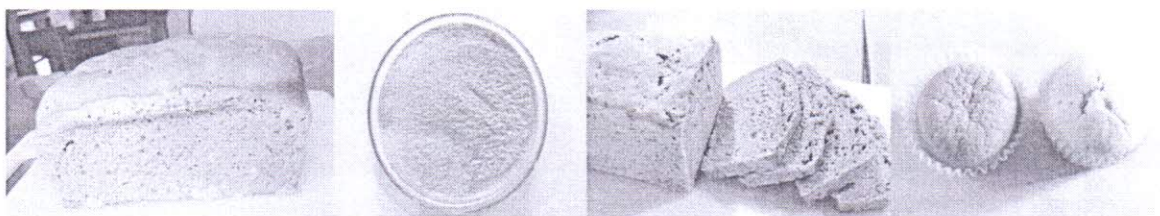
All the activities conducted in the year 2022 were directly related to achieving sustainable development goals (SDG) by 2030, namely, **Goal 2:** End hunger, achieve food security and improved nutrition, and promote sustainable agriculture; and **Goal 12:** Ensure sustainable consumption and production patterns. Programs and projects proposed by the institute to achieve these two goals are also addressed in SDG **Goal 1:** End poverty.

Thirty six (36) research projects were conducted and some of the technologies developed through research are being introduced/ready to be introduced to the field.

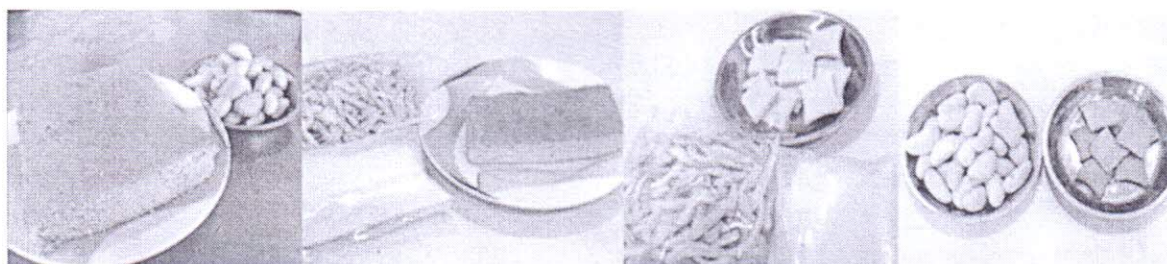
One hundred and seventy six (176) training programmes were conducted; 3673 stakeholders were trained on proper post harvest technologies and 52 new entrepreneurs were introduced to the agro based industries.

In the year 2022, the institute was able to provide 20 consultancies for the postharvest industry island-wide, and 400 lab reports were issued via laboratory services.

Postharvest Technologies ready to be disseminated...



Raajala based products: nutritious food products, ready to be introduced

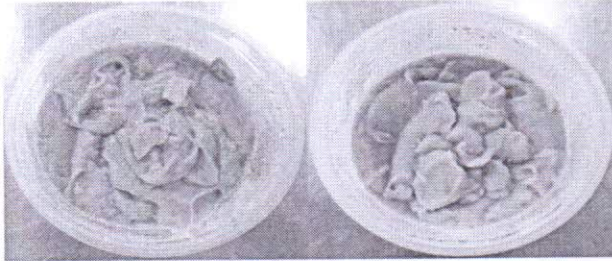


Jack fruit and Jack fruit seed flour based food products: Value addition to Jack fruit



**Avocado based new food products:
solution to reduce postharvest**

Pulp Preservation



Control

Treated with 0.5% Citric



Posharvest loss assessment of selected agricultural food crops.

Implementation of proper postharvest practices in the field has reduced the postharvest loss significantly. A Research project with a survey was conducted to assess the postharvest losses of some selected food crops. Results of the study have revealed that current postharvest loss in papaya, banana, guava, snap bean, cabbage, okra and brinjal are 20%, 26%, 20%, 24, 20, 28% and 20% respectively.

Study on present status of postharvest practices & loss assessment of selected agricultural food crops.



According to the study's findings, the post-harvest losses have decreased from earlier levels as a consequence of people becoming accustomed to employing the right post-harvest technology.

EXECUTIVE REPORT

The year 2022 was a very challenging year for the institute. All the key activities of the institute- research, development projects, technology transfer activities, consultancy, laboratory services and engineering services- had to be completed even amidst the severe economic recession, which resulted in a crisis in fuel and LP-gas, which are very essential components in carrying out these key activities. However, the institute was able to complete almost all of the planned activities with a little deviation, while some development projects were discontinued. Those key activities were aligned for the improvement of supply and value chain management practices of agricultural crops with special focus to the fruits and vegetable sector of the country. And also, all these activities were directly related to achieving sustainable development goals (SDG) by 2030 namely, *Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture*, *Goal 12: Ensure sustainable consumption and production pattern*. Further these activities also addressed to the *SDG Goal 1: End Poverty*. Thus we were able to stride towards the vision of the institute 'To be the center of excellence in sustainable postharvest development for national food security'.

RESEARCH

The research and development programme of the institute was directed

towards solving technological and socio economic problems confronting the postharvest industry. During the year 2022, thirty six (36) research projects were carried out. It consisted with nine (09) research projects continued from 2021, nine (09) research projects initiated in 2022 and four (04) research projects that were conducted as public-private partnership projects thus funded by the private sector. In addition to that, fourteen (14) research projects were conducted by undergraduate students from different universities and they were supervised by the Research officers, Extension officers and the Engineers of the institute.



Assessment of postharvest losses of banana

Furthermore, one research project, "Strengthening Sri Lanka's efforts to quantify greenhouse gases related to postharvest losses" was conducted as a collaborative research project with a research team of Engineering Faculty, University of Peradeniya and the Global Research Aliens, Ministry of primary industries, New Zealand.

DEVELOPMENT PROJECTS

The institute carried out development projects to ensure technology adoption and its impact on the postharvest industry, with a special emphasis on agribusiness development and food security. During the year 2022, six (06) development projects were initiated by the institute. However, they had to be discontinued according to the instructions given by the Ministry of Agriculture, based on the budget circular 02/2022 issued on 01.04.2022 by the Ministry of Finance. Although they were discontinued, all the training activities relevant to the development projects were continued by the technology transfer division.



Information gathering from the farmers: project- Developing a technologically sound regional distribution network for fruits and vegetables

TECHNOLOGY TRANSFER ACTIVITIES (Training & Extension)

The training activities were aimed at updating knowledge and ensuring effective technology transfer activities for the large number of stakeholder groups involved directly or indirectly in supply chain and value chain activities. These included farmers, collectors, whole-sellers, retailers, processors, extension personnel, students from universities and other educational institutes, and beneficiaries of government and non-governmental organizations. During the year 2022, 176 training programmes (19 residential programmes and 157 field programmes) were conducted, and 3673 stakeholders were trained on proper post harvest technologies. Furthermore, 52 new entrepreneurs were introduced to the agro based industries.

These activities were conducted island-wide by the Research and Development Center in Anuradhapura and the district centers at Kurunegala, Kandy, Nuwara-Eliya, Ampara, Hambantota, and Kilinochchi in liaison with the Department of Agriculture, the Department of Agrarian Service, provincial councils, the Mahaweli Authority of Sri Lanka, and non-governmental organizations.

CONSULTANCY, ENGINEERING AND LABORATORY SERVICES

NIPHM provides consulting and other services to public, private, and cooperative sector organizations that are either directly or indirectly involved in the post-harvest industry. Through this, services were given to establish new processing plants, modernize existing mills and plants, and solve technical problems encountered by rice millers and other food processors in their day-to-day operations. NIPHM helped to prepare technical reports, feasibility reports, and special reports for any agro-food processing industry as per their request. The institute supported the stakeholders by providing laboratory and engineering services, especially for the quality control activities in industrial products and process lines. Laboratory services consist of chemical, physical, and microbiological services. Fumigation of warehouses is another service provided by the division of laboratory services to the stakeholder groups. Engineering services consist of machinery and equipment testing and evaluation and operator training. In the year 2022, the institute was able to provide 20 consultancies for the postharvest industry island-wide, and 400 lab reports were issued via laboratory services.

SOCIAL, WELFARE AND RELIGIOUS ACTIVITIES

Strengthening institutional governance is one of the goals of the institute. Employee satisfaction is vital to the growth of the organization. Therefore, various social, welfare, and religious programmes and

activities are organized annually to achieve this goal.

However, the institute was unable to conduct such activities in 2022, due to the regulations of the COVID-19 pandemic as well as the economic constraints that had to be faced by the institute.

FINANCIAL PERFORMANCE

Description	2021 Rs. Mn.	2022 Rs. Mn.	Growth (%)
Deficit for the Year	2.2	15.2	
Cash Equivalent	37.6	28.1	25.3
Total Current Asset	67.4	47.3	29.8
Total Current Liabilities	39.6	12.6	68.2
Net Asset (Equity)	373.7	317.3	15.1

HUMAN RESOURCE DEVELOPMENT

Although it was not able to conduct human resource development activities as planned, due to the Covid situation, research and development staff members were able to participate in 08 online training programmes.

Overall, 2022 was a year of achieving goals in the midst of many obstacles.



Eng. H.M.A.P. Rathnayake
Director/CEO (Acting)

PERFORMANCE HIGHLIGHTS

RESEARCH AND DEVELOPMENT

The research and development programme of the institute was directed towards solving technological and socio economic problems confronting the postharvest industry. During the year 2022, thirty-six (36) research projects were carried out. It consisted of nine (09) research projects that were continued from 2021, nine (09) research projects initiated in 2022, and four (04) research projects that were conducted as public-private partnership projects and thus funded by the private sector. In addition to that, fourteen (14) research projects were conducted by undergraduate students from different universities, and they were supervised by the research officers, extension officers and the engineers of the institute.

In addition to disseminating the research findings as new technologies within the postharvest sector for its improvement, the results of the studies were published in peer-reviewed national and international journals, the Journal of the Institute of Engineers of Sri Lanka, and Symposia conducted by different universities.

Summary of the Research projects are shown in the table below.

	Project Title	Date of Commence ment	Approved Budget (2022)	Financial Progress (as at 31.12.2022)		Physical Progress (%)
				Rs. Mn	%	
1	Research Projecs Continued from 2021 to 2022					
1.1	Study on present status of postharvest practices & loss assessment of selected agricultural food crops.	01.01.2021	2.054	1.39135	67.7	85.7
1.2	Economic evaluation along the supply chain of selected economically important food grains	01.01.2021	1.16	0.23732	20.5	59
1.3	Design and development of monkey and Bat repellent device	01.01.2021	1.55	0.77296	49.9	68.2
1.4	Reduction of postharvest losses of red onion (Allium cepa L. aggregatum group) through improved postharvest technologies	01.06.2021	0.12	0.11926	99.4	99.9
1.5	Potential of substituting wheat flour by jackfruit and breadfruit flour in food products and evaluating their functional properties and sensorial attributes	01.01.2021	0.03	0.02649	88.3	97.5

1.6	Effect of carbohydrate profile and gluten content for the replacement of wheat flour with Dioscorea alata (Rajala)	01.09.2021	0.3	0.1368	45.6	91.7
1.7	Survey on rice mills and other agro food grinding mills	01.01.2021	0.2236	0.22226	99.4	79
1.8	Design and Development of a process line for groundnut oil extraction	01.01.2021	0.491	0.45811	93.3	96.3
1.9	Develop a science based protocol for postharvest handling of Avocado	01.01.2021	0.266	0.10301	38.7	100
2	Research projects initiated in 2022					
2.1	Potential applications of natural antimicrobial agents for enhancement of fresh fruit quality of mango	01.01.2022	0.373	0.051016	13.7	41.7
2.2	Characterization of alternative flour types and their combinations as a partial replacement for wheat flour in flatbreads	01.01.2022	0.32	0.19910	62.2	78.3
2.3	Study the feasibility and design a ventilated trailer for perishable transportation	01.01.2022	0.685	0.50035	73.0	85
2.4	Testing and evaluation of the effectiveness of using low temperature storage as a solution for proper utilization of excess fruit and vegetable production in Sri Lanka	01.01.2022	0.432	0.28689	66.4	77.5
2.5	Solar assisted dryer for drying and dehydration of perishable commodities	01.01.2022	0.7371	0.3144	42.7	76.7
2.6	Identification of currently available stored pest in food commodities and evaluating of potential plant based chemicals under plastic hermetic storage container in Sri Lanka	01.01.2022	0.193	0.05826	30.2	86
2.7	Comparison of air conditioned sales and roadside ventilated sales of selected fruits, vegetables and cut flowers in terms of qualitative and quantitative postharvest losses.	01.01.2022	0.075	0.07427	99.0	100

2.8	Effect of different postharvest treatments on shelf-life extension of fresh cassava roots (<i>Manihot esculenta</i>) for sea transportation	01.01.2022	0.584	0.15090	25.8	55
2.9	Design, development and performance evaluation of railway compartment for vegetable and fruit transportation via railway	01.01.2022	Project was initiated as a collaborative research between NERD center and few discussion rounds were held with the railway Department. It was decided to discontinue the research especially due to the financial issues encountered.			

Detailed progress of the research projects is mentioned in the section ‘Progress of the Research Projects’.

Private Funded Research Projects

1. Utilization of processing waste of pineapple for cider production. Research was funded by Saylanka Earth (PVT) Ltd, Kandulawa, Ibbagamuwa.
2. Development of minimally processed ‘mallum’ mixes from leafy vegetables. Research was funded by Sdharitha Plantations, Anuradhapura.
3. Studying effectiveness of commercial level parboiled rice production process with or without removing of chaff grains in paddy soaking. Research was funded by New Tharaka Rice Processing Center, Ralapanawa, Nochchiyagama.
4. Development of Aloe Vera based value added products special reference to producing jelly and dry powder. Research was funded by Ceylon Agri Ventures, Dharmapala Mawatha, Anuradhapura
5. Strengthening Sri Lanka’s efforts to quantify greenhouse gases related to post harvest losses. Research was funded by New Zealand Greenhouse gas research center, Palmerstone North, New Zealand.

Student Research Projects

	Student	University	Supervisor	Research Title
1	Ms. M.A.L.D.M. Kumari	University of Ruhuna	Dr. (Mrs.) R.M.N.A. Wijewardana	Effects of anti-browning treatment and wax application with wrapping treatment for shelf life extension of tender king coconut under low temperature.
2	Mr. S.D.M. Priyadharshana	University of Jaffna	Dr.(Mrs.) R.M.N.A. Wijewardana	Development and quality evaluation of dehydrated vegetable curry from pumpkin (<i>Cucurbita maxima</i>) and tender jack fruit (<i>Artocarpus heterophyllus</i>)
3	Ms. P.D.M. Samarasinghe	University of Jaffna	Dr. (Mrs.) R.M.N.A. Wijewardana	Development and quality evaluation of <i>Aloe vera</i> pickle.

4	Ms. K.M.S.R. Bandaranayaka	Uwa Wellassa University of Sri Lanka		Preparation and evaluation of the storage quality of green chili (<i>Capsicum annum</i> L.) sauce in mint (<i>Menthe piperita</i>) and Tabasco pepper (<i>Capsicum frutescens</i> L.) flavours.
5	Y. Kowsika	Uwa Wellassa University of Sri Lanka	Dr. (Mrs.) R.M.N.A. Wijewardana	Effects of different drying treatment on preparation of dehydrated tamarind powder (<i>Tamarindus indica</i> L.)
6	Ms. W.M.D.S. Yatiwella	Rajarata University of Sri Lanka.	Mr. W.M.C.B. Wasala	Study on the alternation of physical properties, milling, nutritional and cooking qualities of improved rice varieties during the storage.
7	Ms. P.D.G.M.R. Weerakoon	University of Jaffna	Dr. (Mrs.) R.M.R.N.K. Ratnayake	Development of a plant based product in controlling storage pest of maize.
8	Ms. W.M.I.S. Weerasinghe	Uwa Wellassa University of Sri Lanka	Dr. (Mrs.) R.M.R.N.K. Ratnayake	Potential application of papaya leaf extract in controlling major postharvest diseases of Guava (<i>Psidium guajava</i> L.)
9	Mr. H.M.S.D. Herath	Aquinas College of Higher Studies.	Dr. (Mrs.) R.M.N.A. Wijewardana	Development of a skin moisturizing gel with <i>Aloe vera</i> and natural Occlusive oil.
10	Ms. A.M.R.N. Bandara	Sabaragamuwa University of Sri Lanka.	Mr. W.M.C.B. Wasala	Present Status of post-harvest practices of Guava (<i>Psidium guajava</i> L.), Bitter gourd (<i>Momordica charantia</i>) in Anuradhapura and Kurunegala District
11	Ms. U.E. Arachchi	Peradeniya University	Mr. C.R. Gunawardane	Health Safety of guava products in selected guava production system in Anuradhapura district.
12	Mr. D.M.S.M. Dissanayaka	Sabaragamuwa University of Sri Lanka.	Dr. (Mrs.) R.M.N.A. Wijewardana	The effects of wax coating combine with modified atmospheric packaging for shelf life extension of apple masan (<i>Ziziphus mauritiana</i>) fruit.
13	R.S. Rajapaksha	Sabaragamuwa University of Sri Lanka.	Dr. (Mrs.) R.M.N.A. Wijewardana	Effects of milling and particle size on development of bread from cassava (<i>Manihot esculenta</i>) flour combined with wheat flour.

PROGRESS OF THE RESEARCH PROJECTS

Research Projects continued from 2021

01. Study on present status of postharvest practices & loss assessment of selected agricultural food crops.

During the past two decades, the National Institute of Post Harvest Management carried out different activities to improve the post harvest sector of perishables. However, no studies have been conducted so far to determine whether there has been a positive growth in the postharvest sector. This research was initiated to identify current postharvest practices and losses in a more generalized form which represent the whole scenario of supply chain of fruits and vegetables. Thus, the current postharvest loss of selected food crops (fruits-guava, Banana, Mango, papaya, pineapple, avocado, rambutan, vegetables-carrot, capsicum, cabbage, tomato, beet root, bitter gourd, green chilli, long bean, brinjal, and big onion), was evaluated/ is being evaluated in different supply chains. Furthermore, it evaluates pesticide residual levels of those selected food crops where these data are not available or out dated. As at the end of December 2022, post harvest loss assessment of banana, mango papaya bittergourd, long bean, brinjal, tomato and green chilli was completed. Loss assessment of other crops could not be completed since transport activities had to be controlled due to the fuel crisis in the country in 2022. Therefore, the research will be continued in the first six months of 2023. Financial allocation for the research (2022) was Rs. Mn. 2.054 and the expenditure was Rs. Mn. 1.391. Physical Progress was 85.7%%. Project duration 2 1/2 years, Total allocation for the research is Rs. Mn. 3.992 (2021- Rs. Mn. 1.438, 2022-Rs. Mn. 2.054, 2023-Rs. Mn. 0.5).



Gathering data from different stakeholder groups of the supply chain

02. Economic analysis at different postharvest stages and farmers willingness to store of selected economically important food grains

Post harvest loss (PHL) of food grains is higher in developing countries compared to the other developed nation, This is assisted by several reasons or factors such as, inappropriate harvesting, threshing, drying, storing, transportation as well as milling. PHL of grains in Sri Lanka is ranging from 10 to 15%. In paddy, 7.5% of the loss occurs at the time of storage, which is nearly half of the total loss of paddy according to the FAO data. As this is a huge economic loss to the country and affecting self-sufficiency, National Institute of Post Harvest Management (NIPHM) and several other government and Non-government organization try to facilitate the farmers to store their paddy and other grains themselves in a safe method to reduce loss as well as to increase the profitability of farmer from those grains.

However, the farm level storage of paddy and other grains is not in accepted level. This may be due to several reasons, such as credit, storage space, cost of storage, willingness to storage, opportunity cost and profitability. This research aims to update the existing data and to find the farmers' willingness to storage (WTS), Opportunity cost of storage, factors affecting farm level storage of food grains with different price level and the change in the profit at every post harvest stages of grains including Paddy, Maize, Finger millet, Soya bean, Black gram, Green gram and Cowpea Survey was completed for paddy and it is being continued for the other crops listed above. Project duration is 3 years, 2021-2023. Total Financial allocation for the research is Rs. Mn. 2.29 (2021- Rs. Mn.0.161; however, it was not spent since most of the field activities were not conducted due to Covid 19 padamic situation in the country. 2022- 1.16; Financial progress was Rs. Mn.0.237). Physical Progress was 59%.

03. Design and development of monkey and bat repellent device

Canopy level pest attacks in agriculture has been identified as one of the most important factors that endangers the national food security. Many research attempts are found to minimize the damage of insect pests and fungal pathogens where the least concern is given to control canopy level pests. Canopy level pests that directly reach the canopy of tall fruit trees and spices are the most difficult group to implement control measures compared to animal pests that walk along the ground. Continuous observations and control of animal attacks are highly recommended due to the unpredictable nature of animal pest attacks.

When considering Sri Lankan situation tall canopy fruit trees and spices are severely affected by animal pests. Also, no research evidence is found to address the canopy level animal pest attack in Sri Lanka. Hence, the needs of new technological strategies were identified to repel animal pests that damage tall canopy fruit trees.

Hence, the study was designed aiming to minimize the damage on yield, quality, flower buds and other vegetative parts of tall and seasonal bearing tropical fruit

species due to monkey and bat attacks at home gardens, mini orchards and large farms.

Objective of the study was to reduce of post-harvest losses of fruit crops with automated electronic device in which the specific sound and light frequency ranges of the selected animals can be repelled easily. After having ethical approval to conduct the research, information on historical studies and appropriate methods on canopy level pest control were gathered. Further, a prototype electronic device was designed and fabricated. Field testing will be conducted in 2023. Total Financial allocation for the research was Rs. Mn. 1.883. Total financial progress was Rs. Mn. 0.7756. (2021- Rs. Mn. 0.033; expenditure Rs. Mn.0.003, 2022-Rs. Mn. 1.55; expenditure- , 2023-Rs. Mn. 0.3). Project duration is 3 years, 2021,2022 and 2023.

04. Reduction of Postharvest Losses of Red Onion (*Allium cepa* L. *Aggregatum*) through Improved Postharvest Practice

High storage loss of red onion constrains the onion farmers where a requirement was identified to prolong the storage life to supply seed onions (bulbs) for next cultivation season. Therefore, this research was executed with the objective of reducing the postharvest losses of red onion and increasing the postharvest shelf life thereby to provide seed bulbs for the next season. Two curing conditions were tested; shade curing and artificial curing where the artificial curing was proven as a convenient method to cure onions with a less curing weight loss and within a short period of time, irrespective of the weather condition. Onions cured under above two conditions were stored under controlled atmospheric storage (controlled temperature and relative humidity), to select the best practice to minimize the postharvest loss and extend the shelf life. There, artificially cure red onions that were stored under controlled atmospheric condition was selected as the best method to reduce the postharvest loss. Therefore, red onion seed farmers will be benefited by this method especially



Artificial curing practices

minimizing the storage sprouting and rotting loss. Financial allocations for the year 2022 was Rs. Mn. 0.12 million where Rs. Mn. 0.119255 was expended. Physical progress of the research was 100%. Total financial allocation for the research project was Rs. Mn. 0.268 (2021- Rs. Mn. 0.148, 2022-Rs. Mn. 0.12). Total Financial Progress was Rs. Mn. 0.257028 (2021- Rs. Mn. 0.137773, 2022-Rs. Mn. 0.119255). Project duration was 2 years.

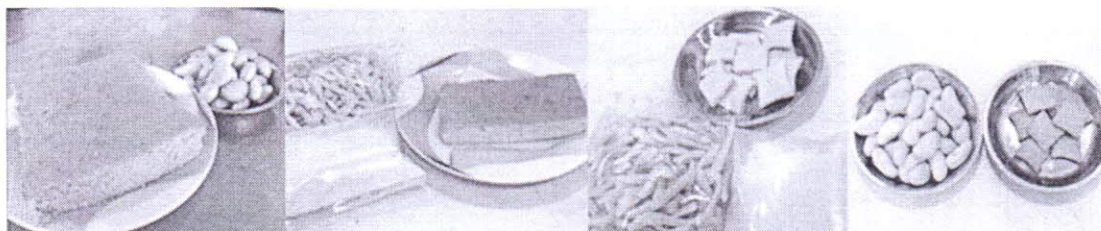
Potential of substituting wheat flour by jackfruit and breadfruit flour in food products and evaluating their functional properties and sensorial attributes

In Sri Lanka, there is a Jackfruit (*Artocarpus heterophyllus*) and Breadfruit (*Artocarpus altilis*) are important and extensively grown multipurpose tree species in Sri Lanka. Unfortunately, these food trees are considered as a poor man's food and listed as an underutilized minor fruit crop in Sri Lanka. At present, there is a huge pre-harvest and post-harvest loss of fruits during the season. Lack of proper marketing channels compared to other fruit crops, unavailability of proper supply chain to areas where it can be consumed and perishable nature are some of the reasons for less utilization of fruits which prevails consumption of jackfruit and breadfruit in Sri Lanka. But still there is a huge untapped potential for processing and marketing for jackfruit related products as it will generate a lots of rural empowerment and augment the rural economy.

When consider the flour based products, wheat flour plays a major role in the flour based products industry. Wheat flour is the most common flour used in bakery and other flour based products. It contains high amounts of proteins that, when mixed with liquids, form gluten. When comparing jackfruit and breadfruit flour wheat flour they are rich source of carbohydrates, fiber, vitamins, minerals and flavonoids, contains complete protein and also gluten free. Gluten can be allergic to some people as well as the price of wheat flour is higher therefore it is necessary to pay attention of replacing wheat flour by possible alternative flour types.

In this background, this research was conducted with the objective of the Identification of the possibility of incorporating matured jackfruit flour, jackfruit seed flour and breadfruit flour in wheat flour based food products and Evaluation of Proximate composition and Sensory properties of the products and uncovering the potential of jackfruit and breadfruit based flour products in development of bakery products.

Production of jackfruit flour, breadfruit flour and jackfruit seed flour was done by dehydrating and milling the jackfruit bulb, jackfruit seed and breadfruit. Then the production of cake, biscuits, bread, buns and noodles were done by practicing conventional production methods. Appropriate proportion of wheat flour and other flour types was evaluated. According to the results production of cakes, biscuits and noodles using jackfruit bulb flour, jackfruit seed flour and breadfruit flour was successful and production of breads and buns using above mentioned flour types was not commercially viable. Total allocation for the research was Rs. Mn. 0.101 (2021 – Rs. Mn. 0.071, 2022– Rs. Mn.0.03). Total financial progress was Rs. Mn. 0.07549 (2021– Rs. Mn. 0.049, 2022 – Rs. Mn.0.02649). The physical progress was 97.5 %.



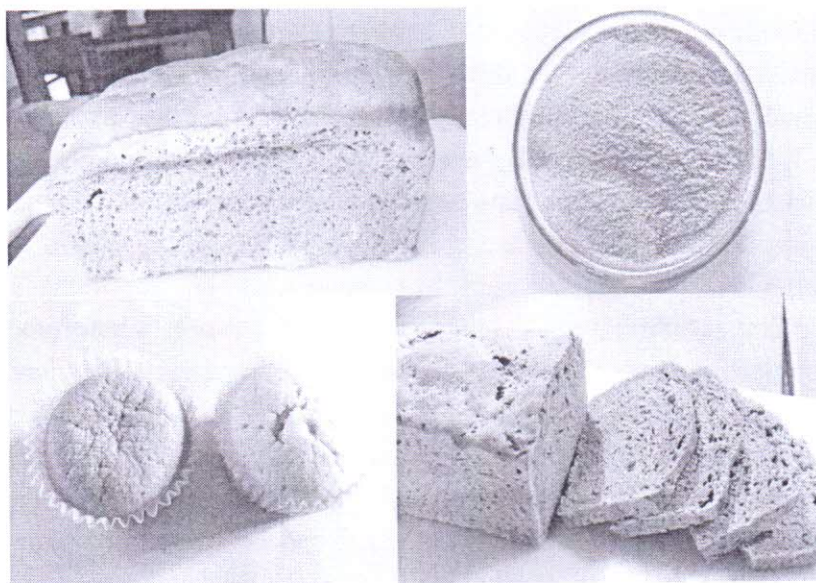
Products developed from jack fruit and bread fruit based flour

05. Effect of carbohydrate profile and gluten content for the replacement of wheat flour with *Dioscorea alata* (raja ala)

Traditional yams are now popularizing throughout country. From the traditional yams, *Raja Ala* (*Dioscorea alata*) has the more demand and cultivations are spreading. It has light purple color which preferred by the most of food processes and consumers. The objective of this research is to replace wheat flour with *Dioscorea alata* (raja ala) in flour and bakery industry of Sri Lanka.

Raja ala flour was made by dehydration of yam in conventional air dryer and heat pump dryer. The quality of flour was superior in heat pump dryer compared to conventional dryer. Best dehydration temperature and time was 45 °C for 6 hours in heat pump dryer. Discoloration of raja ala flour can be controlled by treating with 0.5% citric acid solution for 2-3 minutes before drying. Development of bread from combination of wheat and raja ala flour was conducted and 30% raja ala flour bread was evaluated as the best bread. The particle size of raja ala flour should be reducing to more than 150 µm. Cakes and muffins could be made by using 50% raja ala flour. Some flour properties were measured and some properties will be analyzed in 2023. Issues encountered in

chemical purchasing badly affected to the research progress. Total allocation for the research is Rs.Mn.0.54 (2021- Rs. Mn. 0.02, 2022- Rs.Mn.0.30, 2023- Rs. Mn. 0.22). Total Financial Progress as at December 2022 was Rs. Mn. 0.1558 ((2021- Rs. Mn. 0.019, 2022- Rs.Mn.0.1368). Research is continued to 2023.



Developed 'Rajaala' based products

06. Survey on rice mills and other food grinding mills

Rice mills and others agro food grinding mills play a vital role to provide foods to nation and make a considerable impact in the national economic development of Sri Lanka. Even though the number of rice mills and other agro food grinding mills in each districts is very much important in different aspect for policy makers, development project conductors and for the relevant government bodies, there is no such proper data available with any government institutes so far. But these millers are registered in different government institutes since it is a requirement for operation and for their existence. Therefore, it was collected to collect data from different institutes and made a data base on presently available rice mills and other agro food grinding mills under this project. Basically, data were collected from five major rice processing districts of Anuradhapura, Polonnaruwa, Ampere, Hambanthota and Monaragala.

Total financial allocation- Rs. Mn. 0.4696 (allocation for the research (2021) was Rs. Mn. 0.246 and the expenditure was Rs. Mn. 0.0192; allocation for the research (2022) was Rs. Mn. 0.2236 and the expenditure was Rs. Mn. 0.222) Project duration was 2 years, 2021 and 2022.

07. Design and Development of a process line for groundnut oil extraction

The groundnut (*Arachis hypogaea* L.) is one of the important oil seed crop in legume family and it is a good source of protein and fiber. Groundnut oil is often used as healthy edible oil in some countries around the world. The nutrients that can be found in groundnut oil include a low percentage of saturated fats, a high percentage of monounsaturated and polyunsaturated fat and also rich in essential vitamins and have good antioxidant properties. Therefore it can be used and introduced as an edible instead of coconut oil which is commonly used in Sri Lanka. Red Spanish, Tissa, Walawa, Indi, Tikiri, ANKG1 are the main varieties cultivated in Sri Lanka. The annual production in Yala and Maha seasons is about 27,602 tons (AgStat 2018). Under the new manifesto, the government has recognized 16 important crops including groundnut that should have to be increased the cultivation. Therefore, it is expected that the annual production will be increased in the coming years. Hence, it will be more important to pay our attention on the developing post-harvest practices in terms of minimizing post-harvest losses and value addition of that harvested products as well. In this regard, introduction of oil extraction will be the main value addition product under groundnut cultivation and that can be introduced as a new major market opportunity. Therefore, through this research we developed a process line for groundnut oil extraction from local groundnut varieties by determination of extraction efficiency as, cost of production and capacity of the extraction process.

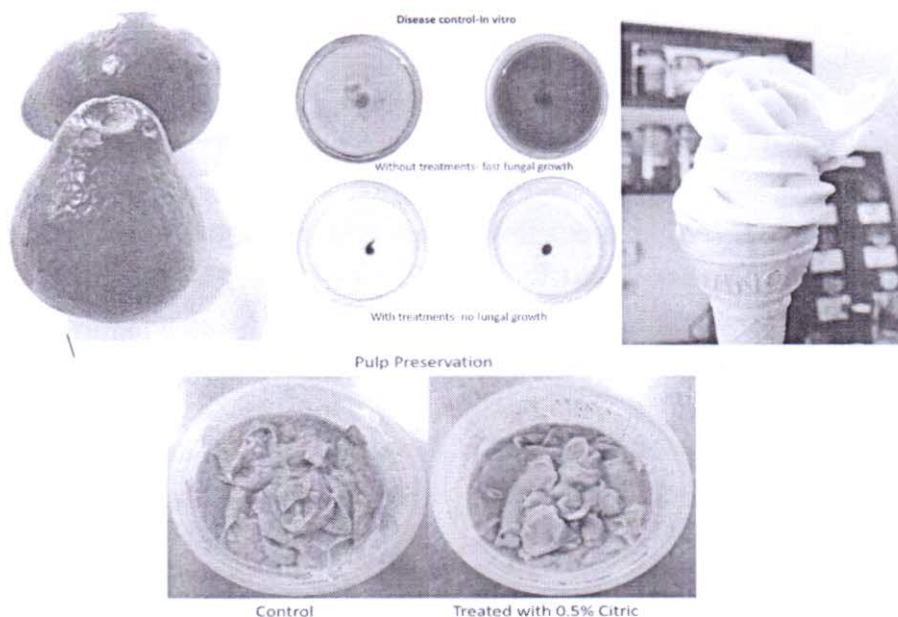
Total financial allocation for the project is Rs. Mn. 1.302. (2021 allocation was Rs. Mn. 0.811 and the expenditure was 0.692; 2022 allocation was Rs.Mn. 0.491 the expenditure was Rs. Mn. 0.458). Physical progress was 96% .



Oil extraction by Screw press oil expeller Extracted groundnut oil samples

08. Development of a science based protocol for postharvest handling of Avocado

As perishables, fruits such as Avocado (*Persea americana* Mill.) shows shorter postharvest shelf life, high postharvest diseases and ripening related issues. Apart from that it is very rare to find avocado based locally produced value added products in the local market. Therefore, this experiment was designed to develop value added products from avocado, to find environment friendly methods (essential oils and plant extracts) to control postharvest diseases, to develop a harvesting tool and to develop effective ripening method for avocado. Separate experiments were done to address the above issues. Optimum ethrel concentration is 4ml/L and exposure time is 24 hours. With this combination avocado fruits ripe within 3 days. Avocado stem rot could be controlled by applying cinnamon bark oil (50% cinnamaldehyde) at the concentration of 0.2% as a spray. Avocado based rice ice cream was developed as a soft ice cream. Apart from that two types of tub ice creams were developed using avocado combination with rice milk and avocado combination with cow milk. Avocado pulp preservation was done with vacuum packing and freezing with natural preservatives. Proper harvesting tool was developed to harvest avocado without mechanical damages. This is a two year research starting from 2021. The total budget allocation was Rs. Mn. 0.592 (2021- Rs. Mn. 0.326, 2022- Rs. Mn. 0.266) and the financial progress was Rs. Mn. 0.419 (2021- Rs. Mn. 0.316; 2022- Rs. Mn. 0.103). Physical progress of the research is 100%. Research findings will be introduced to the field via technology transfer activities.



Research Projects initiated in 2022

01. Potential applications of natural antimicrobial agents for enhancement of fresh fruit quality with special reference to Mango

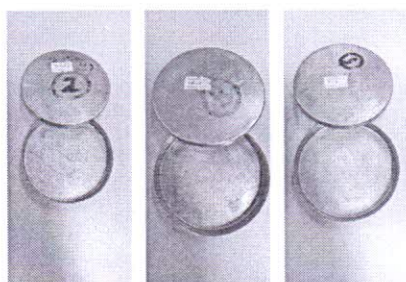
Diseases are the major cause of losses in the postharvest industry and infections can occur either before harvest, between flowering and fruit maturity or during harvest, handling and storage. These diseases are currently controlled with synthetic fungicides. However, the use of synthetic chemicals has many limitations and disadvantages. These include progressively restrictive legislation, social rejection due to toxicological problems affecting humans and the environment, and development of resistance. Owing to their health hazardousness specially due to the oncogenic risks, the world is moving for safer methods such as use of natural or Generally Regarded as Safe (GRAS) chemicals, biological control etc. to control plant diseases. On the other hand, natural products and phytochemicals are gaining the attention globally and numerous studies have been reported on the antimicrobial activity of a wide range of natural compounds. Therefore this project was planned having the objective of identification of possible means of application of natural antimicrobial agents for mango to minimize post harvest disease incidences thus increasing the quality, safety and shelf-life. Thus, the main focus was given to essential oils, as they have proven to be effective against many disease causing pathogens to both humans as well as to plants. Here essential oils from, cinnamon bark, nutmeg, clove bud, black pepper and rosemary was selected to check their potential to control the main pathogen responsible for causing stem end rot of mango. And the experiments are in progress to find out the effective concentrations of these chemicals to be used for that purpose. Upon finding of the most effective concentrations of all the essential oils the combination effect of them will be tested *in-vivo* conditions. Moreover, these combinations will be incorporated into different packaging materials and then they will be tested for their effectiveness to control the major diseases of mango at the post harvest stage.

The total budget allocation for the research project was Rs. Mn 0.523 (2022- Rs. Mn. 0.0373, 2023- Rs. Mn. 0.15) and the financial progress as at the December 2022 was Rs. Mn. 0.051 Physical progress of the research is 41.7%.

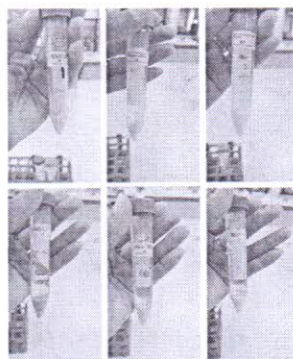
02. Characterization of alternative flour types and their combinations as a partial replacement for wheat flour in flatbread wrappers

Bakery industry in Sri Lanka is one of the emerging and lucrative industries in terms of production, consumption, export and growth prospects. Simultaneously, a trendy approach is developing among the consumers for consuming healthier baked goods, which are ideally, prepared using composite flour mixtures while reducing gluten content. In line with the existing global consumer patterns, the products manufactured using nutritious natural raw materials could use as alternatives for wheat flour rich in gluten.

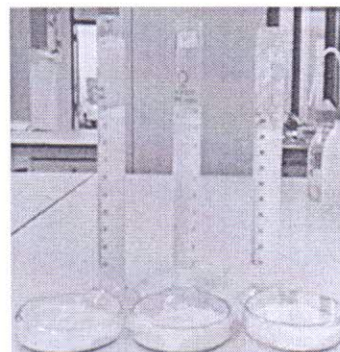
This will be one of greatest attempts to reduce the expenses on the importation of wheat flour satisfactorily while introducing a form of value addition for locally available starches. Meantime, flatbreads are arguably the most widely consumed bread category in the world. In Sri Lanka the standard flatbread varieties and multigrain flatbreads are much popular among specific consumer groups. Product diversification for flatbreads is needed. This research was conducted with the objective of the project is Formulation of reduced gluten composite flour mixtures using jackfruit, bread fruit, cassava and sweet potato flour with other alternatives to use in flatbread industries. In the methodology of the research, Characterization of the properties of flour types, Fine tuning of the batter quality parameters, Quality analysis of the final product, Shelf life evaluation of composite flour mixtures and developed product (Qualitative and Quantitative) and cost calculation are included. Characterization of the flour properties of Jackfruit, Breadfruit, Cassava, Sweet potato, Soy, Rice and Wheat was completed. Presently the characterization of the properties of possible flour mixtures and product development trials are in progress. Based on the analysed flour properties it can be predicted that cassava flour and sweet potato flour will show positive results in composite flour mixtures than jackfruit and breadfruit flours. Total financial allocation of the research is Rs. Mn. 0.545 (2022 - Rs. Mn.0.32 and the expenditure was Rs. Mn. 0.1.99; 2023- Rs. Mn. 0.225)



Sediments of Jackfruit, Wheat Flour and Rice flour



Water and oil holding capacities of Jackfruit, Wheat and Rice flour



Flour Dispersibility

03. Study the feasibility and design a ventilated trailer for perishable transportation

Post harvest loss for perishables is considered around 30-40 % under Sri Lankan conditions. Transportation plays an important role in the marketing of perishables contributing around 20% loss from the total post harvest loss. In Sri Lanka, non-refrigerated trucks are the most using and available transport mode for fruits and vegetables. However, postharvest losses and quality deterioration are considerably high mainly because of overheating/heat accumulation and mechanical damages during non-refrigerated perishable transport. It shows that the conditions of vehicles that are involved in perishable transportation under Sri Lankan context are not

adjusted to reduce the heat build-up during transportation. Therefore, it is necessary to maintain an optimum temperature inside perishable transporting vehicles.

Therefore, this study was initiated with the objective of design, development and evaluation of a ventilated trailer for perishable transportation. Temperature variation and heat accumulation of the vehicles from conventional perishable supply chains were measured and quality analysis of the perishables were obtained at first. According to the results, design and development of the ventilated trailer (lorry body) was carried out. The fabricated lorry body was evaluated for its temperature variation, heat accumulation and perishable quality during transportation.

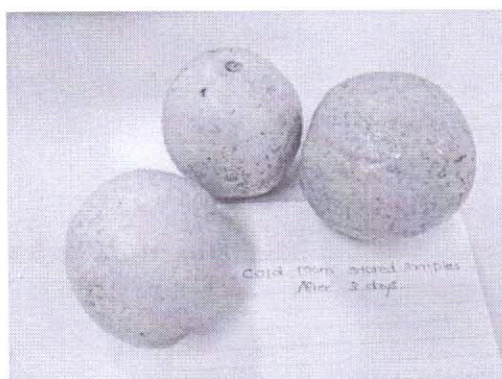
Evaluation of the fabricated lorry body resulted 2-3°C temperature reduction, lower mechanical damages and spoilage %, fair values for total soluble solids/pH/visual quality ratings compared to conventional perishable transporting vehicles concluding that there were qualitative and quantitative advantages fabricated lorry body. However, some further adjustments of the lorry body are required and evaluation of the lorry body will be continued to year 2023. Total financial allocation for the project was Rs. Mn 0.891 (2022- Rs. Mn. 685; 2023- Rs. Mn. 0. 206). Expenditure for 2022 was Rs. Mn. 0.5. Physical progress was 85%.

04. Testing and evaluation of the effectiveness of using low temperature storage as a solution for proper utilization of excess fruit and vegetable production in Sri Lanka

Fruits and vegetables, being perishable in nature require certain techniques of preservation for retaining the freshness intact and making them an acceptable item even after few days of ripening. Due to unavailability of well functioned cold chain in Sri Lanka it is a risk of using low temperature conditions for commodity storage and further marketing through the conventional supply chain. Therefore, this research is mainly focused on testing of various mean of technologies to protect the quality of cold stored commodities during marketing. In this background, this research was carried out to evaluate the effectiveness of using low temperature storage as a solution for proper utilization of the excess fruit and vegetable production in Sri Lanka. Four types of commodities (guava, brinjal, avocado and lime) were collected from farmer field at Anuradhapura district and subjected to do storage trials under low temperature conditions that were identified by previous research. The stored items after conditioning (gradually increasing the produce temperature up to ambient level) were evaluated through the marketing channel. Best condition to store guava at cold storage condition was 6 °C at 90% RH and under this cold storage condition, mature guava fruits could be stored up to 02 weeks without deterioration. After transferring these guava fruits to Air conditioned (20 °C) nature, (from cold storage to air conditioned status) fruits became deteriorate after 04 days. Brinjal could be stored at room temperature for 06 days without deterioration and the best condition to store brinjal at cold storage condition was 10 °C at 90% RH. Under this cold storage condition, brinjal could be stored up to 16 days without

deterioration. After transferring these brinjal to Air conditioned (20°C) nature, (from cold storage to air conditioned status) brinjal became deteriorate after 04 days. Waxed applied treatment was not suitable for avocado if it was stored under room temperature condition and cold storage condition. Optimum temperature to store avocado in cold storage without application of wax was 8°C . Research project is continued to 2023. Total financial allocation for the project: Rs. Mn. 1.182 (2022-Rs. Mn. 0.432; 2023-Rs. Mn. 0.75).

Physical progress up to December 2022: 78%



Guava sample stored at cold room temperature for 03 days



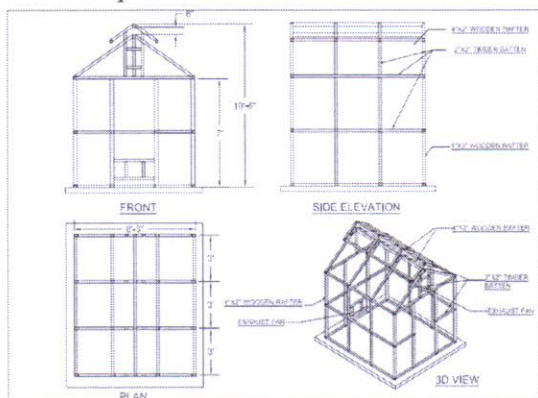
Guava sample stored at room temperature for 03 days

05. Solar assisted dryer for drying and dehydration of perishable commodities

Post-harvest losses of farm products, especially of fruits, vegetables and other perishables, nearly ranged from 20-40 % in Sri Lanka. For low-income farmers, this can mean losing their only stream of revenue. The drying is known as the best method to preserve fruits, vegetables, and other perishables. That increases shelf life of products for almost a year. It is a value addition process that can save nearly 1/3rd losses of seasonal agro-products. The most important objectives of drying are: (i) preservation of fresh products, making them available whole year (ii) conversion of the fresh product into a dry one while maintaining or improving its final quality; and (iii) reduction of the volume and weight of the product for an easier transportation and storage. Solar energy is the most attractive and abundant form of renewable energy sources because it is free, environment friendly and available most of the year. Also, solar dryers can be used to carry food dehydration without relying on electricity. Therefore, this study was carried out to design, develop and evaluate a greenhouse type solar dryer for chilli, pepper and turmeric.

First step of the research was to gather information on historical studies and appropriate design criteria for optimum solar energy absorption. According to the identified criteria, designing and construction of the solar dryer was completed. Finally, performance evaluation of the dryer based on drying efficiency and quality was done. The study location was Anuradhapura and the surrounding area. Total

Financial Allocation is Rs. Mn. 1.007(2022- Rs. Mn. 0.7371; 2023- Rs. Mn. 0.27). Total Expenses as at 31.12. 2022: Rs. Mn. 0.314. Physical Progress was 77 %.



Designed solar dryer

06. Identification of currently available stored pests in food commodities and evaluating of potential plant-based chemicals under plastic hermetic storage container in Sri Lanka

Postharvest loss of grains/pulses is around 10-15%, which storage losses accounts for 6% of the total loss thus storage is the most critical point in grain/pulses supply chain. Pest attack is one of the factors affect for storage loss. For control of pest



infestation, several synthetic pesticides have been applied during the last few decades. However, continuous use of agrochemicals has imposed many detrimental effects. Therefore, non-hazardous alternative methods are needed to be adopted to overcome the issues linked with synthetic pesticides. Plant botanical application and hermetic storage are some alternatives used to

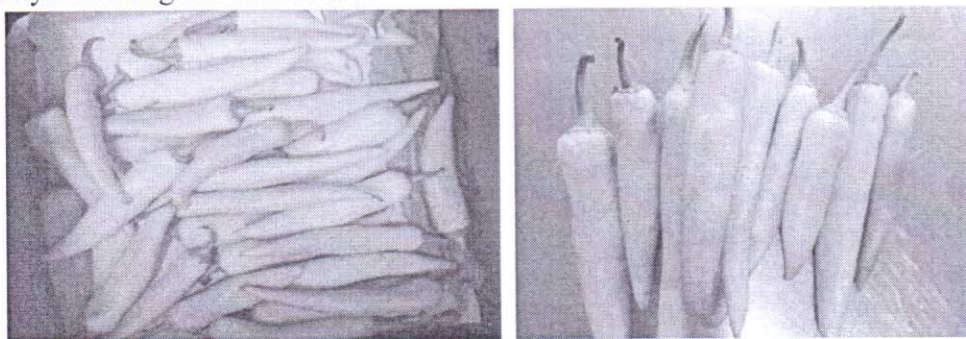
control insect damage. This research was carried out to identify potential stored pests and modify the hermetic storage conditions of stored grains in Sri Lanka.

Identification of available stored pest in stored commodities; pulses (soya bean, greengram, black gram, horsegram), oil crop (groundnut, sesame) and spices (turmeric, chili powder) was the first phase of the research. Then trials were conducted to study the impact of opening plastic hermetic storing containers on stored pests; maize weevil and pulse beetle. Finally, trials were conducted for testing of synergistic effect of plant botanicals for control maize weevil and pulse beetle. *Aegle marmelos*, *Citrus aurantifolia*, *Pimpinella anisum*, *Annona muricata* were selected as plant species for botanical application. 1 %, 2.5 % and 5 % concentrations were used. According to that study *Aegle marmelos* (2.5%) and *Annona muricata* (1%) are the best for further studies. Research is continued to 2023.

Total financial allocation for the research is Rs. Mn. 0.293 (2022- Rs. Mn.0.193; 2023- Rs. Mn. 0.1). Total expenditure as at 31.12.2022 was Rs. Mn. 0.058. Physical progress - 86 % .

07. Comparison of air conditioned sales and roadside ventilated sales of selected fruits, vegetables and cut flowers in terms of qualitative and quantitative postharvest losses.

Fruits and vegetables can be identified as commodities that significantly contribute to food security of the country. Traditional fruits and vegetable supply chain is characterized with high qualitative and quantitative postharvest losses mainly due to its perishability. However, this loss occurs at different stages of supply chain from farm to fork where insufficient details are available. Cut flowers are short lived due to its perishable nature. Retailer is an important segment of the fruits, vegetable and cut flower supply chain that is directly linked with the consumer. Huge postharvest losses can be appeared at retailer's level. Different types of retailer categories that cater to different income groups can be identified in Sri Lankan fruits and vegetable supply chain; pola market, small roadside retail outlets, markets governed under urban council, supermarkets. Most of these retail outlets are ventilated stalls whereas supermarkets are having air-conditioned stalls. Therefore, it is essential to explore different retail markets to identify variations in qualitative and quantitative losses. Objective of this research is identification and comparison of roadside ventilated retail outlets and air-conditioned sales outlets in terms of qualitatively and quantitatively postharvest losses. Suitable retailer shops were selected by doing field survey. Postharvest loss assessment of three fruit sp. (papaya, banana and mango), three vegetable sp. (capsicum, pumpkin and brinjal) and three cut flower sp. (lotus, olu and blue water lilly) at two different conditions were taken while samples kept with them. Results reveal that comparatively good quality characteristics can be observed in air conditioned stalls. However higher wilting percentage appeared in air conditioned stalls for some of the vegetables (brinjal and capsicum). Almost all the samples were able to keep longer time period in air conditioned stalls than roadside retail shops. As well physiological weight loss percentages for all the selected samples were lower in air conditioned outlets. This was a one year research project and total allocation was Rs. Mn: 0.075. Total expenditure was Rs. Mn. 0.074. Physical Progress was 100%.



Capsicum at the road side retail shops; initial quality and the quality attributes at the end of the experiment

08. Effect of different postharvest treatments on shelf-life extension of fresh cassava roots (*Manihot esculenta*) for sea transportation

Cassava (*Manihot esculenta*) plays a major role in the human diet as a food source of dietary energy for people in developing countries. Sri Lanka has a surplus production of cassava and it is an unexploited tuber crop while having high demand in both local and export markets. The total amount of raw cassava exports from Sri Lanka in 2014 was 4,229 metric tons, and the country earned more than 325 million Sri Lankan rupees from cassava exports. Fresh raw cassava tubers are highly perishable, with a shelf life of less than four days after harvest, and they undergo rapid postharvest physiological deterioration, reducing their marketability and consumption quality. So the present study proposes to find the most effective method for storing Sri Lankan cassava by extending its shelf life during exportation.

Hence this study investigated the effect of low temperatures and wax treatment on shelf life extension of cassava. The "MU51" local cultivar was chosen, and it was waxed and stored in three different low temperatures (4 °C, 8 °C, and 12 °C) with 85% RH and ambient conditions. In this study, post-harvest shelf life was determined by checking quality parameters (pH, flesh color, firmness, starch content, moisture content, dry matter content, total soluble solids, titrable acidity, weight loss, and cyanide content) using analytical methods during storage time at a four-day interval. Results revealed that the moisture content, dry matter content, starch content, flesh color, texture, weight loss, and total soluble solids of both waxed and non-waxed samples were significantly ($p < 0.05$) differed with temperature during storage. Moisture content was reduced by 7.9% in non-waxed ambient samples, 3.2% in waxed samples stored at 8°C. Starch content was reduced by 25.07% in non-waxed ambient samples and 12.87% in waxed samples stored at 4°C. At the end of storage time, waxed samples at 4°C showed the lowest cyanide content (7.48mg/kg). At the end of three weeks, the highest percentage of weight loss was shown in non-waxed ambient samples. It was about 3.05%. There was no significant ($p > 0.05$) difference in pH and titrable acidity. Relatively high pH (6.83-7.06) and titrable acidity changes (0.3-0.227) were observed in ambient, non-waxed samples. This study concluded that waxed cassava roots at low temperature (4°C) could be kept for a longer period of time than at ambient temperature, and waxed cassava showed better quality characteristics than non-waxed cassava roots. Total allocation for the research is Rs. Mn. 0.734 (2022- Rs. Mn. 0.584; 2021-Rs. Mn. 0.15). Total expenditure as at 31.12.2022 was Rs. Mn. 0.151. Physical progress is 55%.

DEVELOPMENT PROJECTS

Development projects were carried out by the institute in order to ensure technology adoption and their impact on the postharvest industry with special emphasis on agribusiness development and assuring food security. During the year of 2022, six development projects were initiated by the institute in the key areas of development of agro based industries in the country and the total financial allocation for the projects was Rs. Mn. 22.07 (Under vote: 426-02-03-008-2509). However, based on the budget circular, 02/2022 on government financial management, the ministry of agriculture instructed to discontinue the development projects and funds received was based on the expenses incurred at the end of the second quarter. Thus, total fund received was Rs. Mn. 4.03, which was considered in the following table as the approved budget. Further, 4 projects were discontinued from the date of 30.06.2030 and some of the activities of the other 2 projects were continued under the institutional recurrent budget (Vote: 426-02-03-007-1509). Details of all the projects are summarized below.

	Project Title	Date of Commencement	Approved Budget (2022)	Financial Progress (as at 31.12.2021)	
				Rs. Mn	%
1.1	Developing a technologically sound regional distribution network for fruits and vegetables	01.01.2022	0.57769	0.57769	100
1.2	Development of cottage level rice processing industry	01.01.2022	0.026	0.026	100
1.3	Development of on-farm storage facilities of rice maize and pulses to increase the farmers income	01.01.2022	0.014	0.014	100
1.4	Establishment of medium scale extrusion units for development of value added extruded products by using local yams,jack,maize,pumpkin and other food crops	01.01.2021	3.942	3.942	100
	Total		4.03	4.03	

Details of the projects further continued under the recurrent budget are given below.

1. Developing a Technologically Sound Regional Distribution Network

Improper distribution chain of vegetables and fruits is the main reason for higher price fluctuation and higher postharvest losses of perishables. Therefore, the project launched to develop a technologically sound regional distribution network for fruits and vegetables. It is also implemented to provide technologies and necessary facilities to improve the handling activities of fruits and vegetables to the beneficiaries of the project. These beneficiaries were selected based on their willingness to join the project and from the stakeholders who are in the current supply chain in the selected areas.

With all factors being considered in the project covering all activities and stake holders of the supply chains of fruits and vegetables, loss reduction and high profits gained by entrepreneurs and making high quality produce products being available in the market will enable the project to be highly successful. Initially the areas and the beneficiaries were identified who are farmers, transporters and retailers to proceed the project as expected. Successfully a new regional supply chain was improved in Wariyapola area and few more supply chains are being tested. This is a 3 year project starting from the year 2021. The budget allocation for the year 2021 was Rs. (Mn) 5.45 and total expenditure was Rs. (Mn) 5.303. The budget allocation for the year 2022 was Rs. (Mn) 0.20085 and the expenditure was done using 2 vote numbers. Initial vote number was 426-02-03-008-2509 and expenditure amount was Rs. (Mn) 0.057769 and later vote number was changed to 426-02-03-07-1509 and expenditure amount was Rs. (Mn) 0.038009.

2. Establishment of medium scale extrusion units for development of value added extruded products by using local yams, jack, maize, pumpkin and other food crops

Nowadays extruded products are well popular among young generation. So there is a necessity of introducing more nutritious food items in ready to eat forms. Thus, considering availability, popularity and nourishment, value added products can be developed through the extrusion process by using yams, jack, maize, pumpkin and other food crops that well grown in Sri Lanka.

Under this project, an Extrusion machine was established at the National Institute of Post-Harvest Management. The extrusion unit is mainly equipped with flour mixer, twin type double screw extruder machine and flavoring machine, gas filling automatic band sealer and batch/date coder machine. Extruded snacks from composite flour mixes were developed by using maize, rice, cassava, pumpkin and wheat flour. For all developed recipes, more than 60% of maize flour was required as maize flour is the main ingredient in extruded snacks. Addition of more rice flour was resulted a hard textured extruded snack while addition of cassava leads to improve the binding quality of snacks. The budget allocation for the year 2022 was Rs. (Mn) 4.1694 and the expenditure was done using 2 vote codes. Initial vote number was 426-02-03-008-2509 and expenditure amount was Rs. (Mn) 3.942 under that code and later vote number was changed to 426-02-03-07-1509 (Recurrent budget) and the expenditure amount was Rs. (Mn) 0.0542. The training part will be conducted on 2023 year with a new project proposal.



Purchased Extruder and the extruded products obtained by the first trial

TECHNOLOGY TRANSFER ACTIVITIES

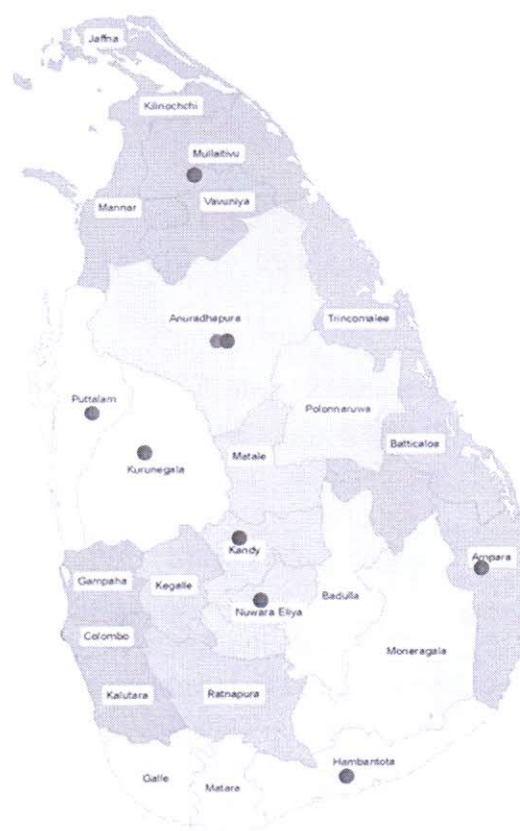
Extension division carries out its technology dissemination activities through its island wide extension Centers in liaisons with government and non-government organizations. Technology dissemination through field level extension work, which is one of the major activities of the institute, was continued during the year 2022.

Main different Sectors Selected for Technology Transfer activities.

- a) Minimization of postharvest losses in agricultural crops
- b) Introducing technologies for storage methods
- c) Processing of rice, pulses and other grains
- d) Spice processing
- e) Value addition for fruits and vegetables
- f) Rice and pulse based product development
- g) Awareness programs on human nutrition and food habits in Sri Lanka

The island wide extension network consists of eight field Centers located in the following major crop producing areas:

1. Anuradhapura (covering Anuradhapura, Polonnaruwa, Trincomalee)
2. Ambanpola (covering Kurunegala, Puttalam)
3. Kandy (covering Kandy, Matale, Kagalle)
4. Nuwara Eliya (covering NuwaraEliya, Welimada and Badulla)
5. Ampara (covering Ampara, Monaragala, part of Baticallo, Mahawelli System C)
6. Hambantota (covering Hambantota, Matara, Galle, Ambilipitiya)
7. Kilinochchi (covering Kilinochchi, Vavuniya, Mulathiv, Jaffna, Mannar)
8. Colombo (covering Colombo, Gampaha, Kaluthara)



Currently island wide technology transfer activities are covered by 8 extension centers

TRAINING

Training programs were conducted with the aim of improving supply and value chains of agricultural commodities, ultimately to reduce the postharvest losses. These programs were conducted under following two strategies;

- Residential training programs
- Non-residential programs

Programs conducting at the institute are referred to as residential training programs and the programs conducted in the field are considered as non-residential training programs. All these programs are based on stakeholder requirement and were organized to cater to the training need of the beneficiaries.

Residential Training Programs programs were conducted at Research and Development Center in Anuradhapura. Beneficiaries of the training programmes were mainly farmers/farm women, collectors, transporters, whole sellers, retailers/traders and processors. Further these programs were also conducted under training of trainer aspect for officers of government and non-governmental organizations, students of universities, technical colleges and schools. These programs were aimed towards awareness creation on postharvest technology, entrepreneur development, loss reduction, process and product quality improvement, etc.

Non-residential/ Field training programs were conducted in the field itself. These are conducted by the R&D center in Anuradhapura and the extension centers of NIPHM.

During the year 2022, 19 short-term residential training programmes and 157 field training programmes were conducted. From these training programmes. 3673 people were trained in various disciplines of post-harvest technology. Some of the residential programs had to be canceled in accordance with the COVID-pandemic health regulations.

For the stakeholders in the supply and value chains of agricultural produce, such as farmers and farmwomen, collectors, transporters, whole sellers, retailers/traders, and processors, training programs were conducted with the goal of raising awareness about postharvest technology, entrepreneur development, loss reduction, process and product quality improvement, etc.

Many of these stakeholders are using the technologies given in these training programs. Through the technical knowledge attained, knowledge improvement, quality enhancement of produce, income generation, rural empowerment, and many other benefits were achieved. This directly contributes to the loss reduction and

quality improvement of the local produce in the agriculture sector, which is one of the main limiting factors in national development in line with food security.

Further these training of stake holders had contributed to industrial development, economic development and social development with improved living standards as well. Thus, 52 new entrepreneurs were introduced to the agro based industries.



Technology adoption in the field

CONSULTANCY SERVICES

National Institute of Post Harvest Management (NIPHM) provides consultancy and other services to public, private and cooperative sector organizations that are either directly or indirectly involved in the post-harvest industry. Through this, services are given to establish new processing plants, modernizing of existing mills and plants and to solve technological problems encountered by rice millers and other food processors in their day-to-day operations. In the year 2022, NIPHM helped to prepare technical reports, feasibility reports and special reports for different agro food processing industries as per their request. Institute supported the stakeholders by providing laboratory and engineering services especially for the quality control activities both in industrial products and process lines. Laboratory services consisted with chemical, physical and microbiological services whereas engineering services included machinery and equipment testing and evaluation, and operator training. In the year 2022, the institute was able to provide 20 consultancies for the postharvest industry island wide.

Summarized details of consultancies are listed below.

No	Name of the Customers	Services
01	C.W.E.	Renovation of the rice mill - CWE at Hingurakgoda
02	Rajarata University of Sri Lanka	Consultancy on application of post harvest technologies
03	Ministry of Finance	Providing a report after inspection of machineries
04	C.W.E.	Submission of a report on the observations of the Pannegamuwa rice processing center
05	Cooperative society of Puttalam Rice processors, Anamaduwa	Submission of a report on capacity expansion of the processing center
06	SAP Project	Providing a technical report
07	J.S.A.D.P.Senarathna	Providing a report on small scale dryer for paddy
08	R.D.V.J.Rajapakse	Providing a report on fruit and vegetable dehydration
09	CWE	Submission of a technical report to Pannegamuwa rice processing center
10	Digasee East (Pvt) Ltd	Submission of a technical report on dehydration of fruits and vegetables
11	W.G.S.T.Walpola	Submission of a technical report on dehydration of fruits and vegetables
12	C.W.E	Participation to the Technical evaluation committee
13	Cooperative society, Kobeigane	Observation of rice processing unit
14	Sri Lanka Cashew Corporation	Inspection of the machineries and submission of a report

15	Cooperative Society, Pemaduwa, Wilachchiya	Submission of a report on rice milling
16	Kobeigane Cooperative Society	An estimation and a report on rice milling were provided
17	Sri Lanka Food promotion Board	Report on modernization of the Kalankuttiya rice processing center
18	Agriculture Modernization	Providing technical specifications to produce high quality peanut oil
19	Sri Lanka Cashew Cooperation	Inspection on cashew processing machineries at Puttalam
20	Cooperative society at Wilachchiya Pemaduwa	Providing a technical specification report

Laboratory Services

The Institute played an important role in exercising quality control of agro/food products in the country by analyzing samples received from both private and public sector organizations for their physical, chemical and microbiological quality. NIPHM is equipped with well-developed laboratory facilities; especially the chemical laboratory is equipped with Atomic absorption spectrophotometer, Gas chromatography and high performance liquid chromatography, Gas chromatography Mass spectrometer etc. and the newly renovated Microbiology laboratory is equipped with Biosafety cabinet, autoclaves, incubators, ovens, light microscopes and image processing microscope etc.

Using these facilities, NIPHM has commenced to outsource the laboratory facilities and also taking accreditation for some of its laboratory analyses. Fumigation of grain warehouses is another promising facility given through laboratory services to the stake holders. During the year 2022, 400 laboratory reports were issued to the stakeholders after analysing their food samples. Further, 5 fumigations were conducted.

CAPACITY BUILDING AND PRODUCTIVITY

Institute takes a keen interest to enhance the knowledge of its employees. The following officers of the Institute underwent postgraduate study and training in the fields pertaining to Post Harvest Technology during the year 2022.

Postgraduate Degree Programmes

Continued programmes

Mr. W.M.C.B. Wasala
Ph.D. in Postharvest Technology
Post Graduate Institute of Agriculture (PGIA)
University of Peradeniya

Eng. (Mr.) B.D.M.P. Bandara
Ph.D. in Bio System Engineering
Post Graduate Institute of Agriculture (PGIA),
University of Peradeniya

Mrs. C.K.Marasinghe
Ph.D. in Engineering
Center for Engineering Research and Postgraduate Studies
Faculty of Engineering, University of Peradeniya

Miss. S.S.K.Weerasinghe
M.Sc. in Horticulture
Post Graduate Institute of Agriculture (PGIA)
University of Peradeniya

Mrs. W.B.W.M.R.C.P. Aluvihare
M.Sc. in Horticulture
Post Graduate Institute of Agriculture (PGIA)
University of Peradeniya

Mrs. G.E.D.A.M. Jayarathne
Ph.D. in Food Science
University of Sri Jayawardenepura.

Miss K.D.B.V Wijayasinghe
M.Sc. in Crop Science
Post Graduate Institute of Agriculture (PGIA)
University of Peradeniya.

Miss M.H.S.M. Hettiarachchi
M.Sc. in Horticulture
Post Graduate Institute of Agriculture (PGIA)
University of Peradeniya

Short term training/ Meetings/Conferences

Research and development staff participated in training programs/workshops conducted on a virtual platform since they were unable to attend overseas trainings under the COVID pandemic situation. Details are listed below.

	Name of the programme	No. of participant	Duration of the programmes
1	Certified reference materials training for testing laboratories	01	3 hours
2	Online Training Sessions on the Sustainable Development of Special Agricultural Products for the Implementation of the FAO Global Action on One Country One Priority Product (OCOP) in the Tropics	03	2 days
3	Sustainable production chain of safety fruits and vegetables commodity with innovation and drying technology for developing country	01	14 days
4	Online training on Prevention of postharvest loss in the value chain of agricultural crops	01	5 days
5	Digital Multicounty Workshop on The Internet of Things in Agriculture and Food Supply Chain Management	01	3 days
6	Support and Assistance in the Development of Intellectual Property (IP) Policies for Universities and Research Institutions in Sri Lanka	01	07 days

AWARDS AND RECOGNITIONS

Eng. H.M.A.P. Rathnayake

- Member of Faculty Board, Faculty of Agriculture, Rajarata University of Sri Lanka
- Member of Board of study of Master of agriculture degree programme, Rajarata University of Sri Lanka

Dr. Nilanthi Wijewardana

- Steering Committee Member of the Sri Lanka Association for Advancement of Sciences (SLAAS), Sri Lanka
- Member of the working committee of the Sri Lanka Standard Institution for Formulation of standards for papaya
- Chairman, environmental committee of SLAAS
- Consultation on Agriculture and Livestock Sector for Review and Update of Nationally Determined Contributions (NDCs) of the Climate Change Secretariat of the Ministry of Environment, Sri Lanka.

Mr.W.M.C.B.Wasala

- Member, National Committee in Postharvest Technology coordinated by Sri Lanka Council for Agriculture Research Policy
- Member, Working Group for Storage of Paddy and Rice, Sri Lanka Standard Institute

Dr. R.M.R.N.K. Ratnayake

- Secretary, Sri Lanka association for mycology and plant pathology

PUBLICATIONS

- Kumara, B.A.M.S. and Menike, G.D.N. (2022). Effectiveness of Cinnamon Bark Oil under In-vitro Conditions to Control Phomopsis sp. Isolated from Guava (Psidium guajava). In: Proceedings of the 8th International Conference on Dry Zone Agriculture., p.74. Available at: URL: <https://www.juice.jfn.ac.lk/icda/> ISSN: 2465-6143.
- Kumara, B.A.M.S. and Menike, G.D.N. (2022c). In-vitro assessment of Cinnamon bark oil as an effective antifungal agent to control avocado stem end rot caused by Lasiodiplodia sp. In: Proceedings of the Second National Symposium of Sri Lanka Association for Mycology and Plant Pathology. Second National Symposium of Sri Lanka Association for Mycology and Plant Pathology. Sri Lanka Association for Mycology and Plant Pathology, p.16. ISBN 978-624-5159-01-7.

- Madushani, M. A., T. D. C. Priyadarshani, K. W. A. Madhushan, G. D. N. Menike, P. A. Weerasinghe, U. G. A. I. Sirisena, H. R. G. Tharaka and D. M. D. Dissanayake (2022). Solid Formulation of *Trichoderma virens* for the Management of Banana Anthracnose Caused by *Colletotrichum musae*. 34th PGIA annual congress. In press.
- Weerasinghe, W.M.S.S.K., Menike, G.D.N., Wasala, W.M.C.B. and Ratnayake, R.M.R.N.K. (2022). Efficacy of ozone treatment in controlling microbial growth on selected upcountry vegetables. Proceedings of the Second National Symposium of Sri Lanka Association for Mycology and Plant Pathology. Second National Symposium of Sri Lanka Association for Mycology and Plant Pathology. p.14. ISBN 978-624-5159-01-7.
- Wickramasinghe, W. M. D. M. , Priyadarshani, T. D. C. , Egodawatta, W. C. P. , Beneragama, D. I. D. S. and Menike, G. D. N. (2022). Dynamics of Rice Brown Leaf Spot Disease (*Bipolaris oryzae*) Incidences due to Seasonal Weather Differences in the Dry Zone of Sri Lanka. 34th PGIA annual congress. In press.

2022 patent application

Name: G.E.D.A.M. Jayarathna

Topic: Development of a food additive to preserve food by incorporating of oil extractions of nutmeg (*Myristica sp.*) and cinnamon (*Cinnamom zeylanicum*)

Applied on: 31.07.2020 (still processing)

SOCIAL, WELFARE AND RELIGIOUS ACTIVITIES

Due to COVID-19 regulations and other financial limitations that had to be dealt with, the institute was unable to perform social, welfare, and religious activities.

HUMAN RESOURCES

The total permanent staff of the Institute was 155. Filled cadre positions as at end of December 2021 was 118. This total comprised of 52% in the technical divisions and 48% in the supporting divisions.

As at 31st December 2022

Position	Total Cadre Positions	Filled Cadre Positions
Higher Management Positions		
Director	01	-
Additional Director (Administration & Finance)	01	01
Additional Director (Research & technology Transfer)	01	01
Sub Total	03	02
Research & Development Staff		
Principal/ Chief Mechanical Engineer	01	-
Principal Research Officer	02	02
Principal Extension Officer	01	-
Senior Research Officer	03	01
Senior Mechanical Engineer	02	01
Senior Extension Officer	01	-
Research Officer	14	11
Mechanical Engineer	06	02
Extension Officer	05	05
Economist	01	-
Sub Total	36	22

Supportive staff

Staff	Total Cadre Positions	Filled Cadre Positions
Internal Auditor / Senior Internal Auditor	01	01
Accountant / Senior Accountant	01	01
Technological Officer (lab)	01	01
Administration Officer	02	02
Librarian/ Publication Officer	01	01
Extension Assistant	10	09
Draughtsman	01	01
Technical Assistant	03	02
Technical Assistant (Civil)	01	01

Management Assistant (cashier)	01	01
Management Assistant	27	24
Laboratory Assistant.	04	02
Equipment Operator	02	02
Driver	13	12
Electrician	01	-
Welder/ Forman	01	-
Mechanic / Technician	02	02
Mill / Machine Operator	03	02
Boiler Operator	02	-
Cook	01	01
Office Aide	18	18
Boiler Assistant	01	-
Labourer (Sanitary)	03	03
Labourer (Canteen)	02	02
Security Guard	06	06
Maintenance Helper	08	08
Sub Total	116	102
Total cadre positions	155	126

Expertise areas of Research and Development staff

In the area of post-harvest technology, the institute has good expertise in rice processing, grain storage and considerable expertise in fruit and vegetable, spice. The research and technology staff consists of engineers, agriculturists, chemist, microbiologists, food scientists etc. This help to analyses problems in different areas.

Distribution of Research and Development staff

No.	Area	Male	Female	Total
01	Agriculture	07	11	18
02	Engineering	03	03	06
03	Science	01	01	02
04	Food Science	-	01	01
05	Total	11	16	27

EXECUTIVE STAFFAs at 31st December 2022**DIRECTOR/CHIEF EXECUTIVE OFFICER (Acting)**

Eng. H.M.A.P. Rathnayake
BSc. Eng, MEng. CEng.MIE (SL)

ADDITIONAL DIRECTOR (RESEARCH AND TECHNOLOGY TRANSFER)

Eng. H.M.A.P. Rathnayake
BSc. Eng, MEng. CEng.MIE (SL)

ADDITIONAL DIRECTOR (ADMINISTRATION AND FINANCE)

Mr. R.K.A.P. Ramanayake
BSc. Mgt. Licentiate Certificate, ICA, MIPFDA

RESEARCH DIVISION**HOD | Principal Research Officer**

Dr. (Mrs.) Nilanthi Wijewardana
BSc. Agric, MSc. Agric, MPhil, PhD

Research Officers

Mrs. Y.M.P. Samarasinghe
B.Sc. Agric. MSc in Geo Informatics

Mr. B. A. M. S. Kumara
B.Sc. Agric. M.Sc.(Organizational Management) M.Sc.(Horticulture)

Miss. T. M.A. N. Weerasinghe
B.Sc. in Export Agriculture (special), M.Sc. in Food Science & Technology

Miss G. E. D. A. M. Jayarathna
B.Sc. Food Science & Tech. (special), M.Sc. in Food Science and Nutrition

Miss W. M. S. S. K. Weerasinghe
B.Sc. Agric. M.Sc. in Organizational Management, M.Sc.(Horticulture)

Mrs. W. B. W. M.R. C. P. Aluwihare
B.Sc. Agric. MSc in Horticulture (Reading)

Mr K. D. T. Hettige
B.Sc. Agric., M.Sc. in Food and Nutrition

Mrs G. D. N. Menike
B.Sc. Agric. M.Phil. in Molecular and Applied Microbiology(Plant Protection)

ENGINEERING DIVISION**HOD | Senior Mechanical Engineer (Acting)**

Eng. B.D.M.P. Bandara
BSc. Eng, MEng. CEng. MIE (SL)

Chief Mechanical Engineer

Mrs. D. P. Senanayake
BSc. Eng, MPhil. CEng. MIE (SL)

Mechanical Engineers

Mrs. C. K. Marasinghe
B.Sc. Eng., M.Phil.(Eng.), AMIE (SL),

Mr. V.G.K.Maduranga
B.Sc. Eng.

EXTENSION DIVISION**HOD | Senior Research Officer**

Mr. W.M.C.B.Wasala
BSc. Agric, MSc. Agric, MPhil.

Extension Officer

Mr. P.G. Lalith Wasantha
B.Sc. Agric., MSc Agric.

Mr. M.M. Herath
*B.Sc Agric., Dip. in Counseling
Ph.D.(Reading)*

Mr. N. Somakanthan
B.Sc Agric., MSc Agric.

Ms. Lakmini Senavirathne
B.Sc Agric.,

PROJECT MANAGEMENT DIVISION**HOD | Senior Research Officer**

Mr. W.M.C.B. Wasala
BSc. Agric, MSc. Agric, MPhil. Ph.D. (Reading)

LABORATORY SERVICE DIVISION**HOD | Senior Research Officer (Acting)**

Mr. Chaminda Gunawardhane
BSc (Chemistry) special.

Technological Officer

Mr. Champika Kumara
NCT (Electrical)

PLANNING AND MONITORING DIVISION**HOD | Senior Research Officer**

Dr. (Mrs.) Ruwanka Rathnayake
BSc.Sp. (Botany), MSc., Ph.D

Economist

Ms. K.A.T.S. Kumari
BSc. Agric, MSc (Reading)

ADMINISTRATION DIVISION**HOD | Additional Director (Admin & Finance)**

Mr. R.K.A.P. Ramanayake
BSc. Mgt.Licentiate Certificate, ICA, MIPFDA

Administrative Officer

Mr. Janaka Subasinghe
BSc.

Administrative Officer

Mrs. D.N. Munasinghe

FINANCE DIVISION

HOD | Accountant

Mr. I.M.N.P. Illangasinghe
B.Com (Sp.), APFA, ACPM, MBA (Reading)

ACADEMIC DIVISION

Senior Mechanical Engineer (Acting)

Dr. (Mrs). D.M.S.P.Bandara
BSc. Eng, MPhil. CEng.MIE (SL) Ph.D.

INTERNAL AUDIT Division

HOD | Internal Auditor

Mr. R.M.D.Rathnayake
BSc (Accounting)

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
STATEMENT OF FINANCIAL PERFORMANCE FOR THE YEAR ENDED
31ST DECEMBER, 2022

	NOTES	2022 RS.	2021 RS.
REVENUE			
General Treasury Fund - Recurrent	6	129,133,778.95	125,035,378.13
Transfers from Other Agencies	7	18,384,499.20	44,696,747.14
Amortization of Capital Grants	8	20,803,474.95	30,123,943.36
Self Generated Income	9	9,486,599.69	3,621,980.33
Other Income	10	3,156,571.36	4,058,156.03
TOTAL REVENUE		180,964,924.15	207,536,204.99
EXPENSES			
Wages, salaries and employee benefits	11	99,808,949.36	94,067,518.11
Supplies and consumables used	12	16,746,320.11	14,425,984.46
Depreciation and amortization expenses	13	44,728,521.31	44,655,476.02
Other expenses	14	12,813,787.61	11,245,445.60
Asset Revaluation Loss	14.1	5,000.00	
Project Expenses	15	22,036,706.20	45,366,229.59
Finance costs	16	18,670.00	27,520.00
TOTAL EXPENSES		196,157,954.59	209,788,173.78
SURPLUS / (DEFICIT) FOR THE PERIOD		(15,193,030.44)	(2,251,968.79)

The accounting policies and notes from page 05 To 20 an integral part of these Financial Statements.

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
STATEMENT OF FINANCIAL POSITION AS AT 31ST DECEMBER, 2022

	NOTES	2022 RS.	2021 RS.
ASSETS			
NON - CURRENT ASSETS			
Property, Plant and Equipment	17.1	234,939,606.45	271,581,026.34
Intangible Assets	17.2	590,853.23	-
Investments	18	20,000,000.00	20,000,000.00
Other non-current assets	19	14,465,630.72	14,663,482.14
TOTAL NON CURRENT ASSETS		269,996,090.40	306,244,508.48
CURRENT ASSETS			
Cash and cash equivalents	20	28,064,586.60	37,603,650.50
Receivables	21	4,851,937.67	2,213,426.65
Inventories	22	13,839,130.82	27,303,398.25
Advances	23	97,045.50	105,695.50
Other current assets	24	464,945.43	192,000.00
TOTAL CURRENT ASSETS		47,317,646.02	67,418,170.90
TOTAL ASSETS		317,313,736.42	373,662,679.38
EQUITY AND LIABILITIES			
EQUITY			
Initial Capital	25	69,907,594.42	69,907,594.42
General Capital Fund		54,437,752.75	70,083,506.65
Assets Revaluation Surplus - Vehicle		34,702,988.00	34,702,988.00
Assets Revaluation Surplus - Plant & Machinery		11,316,204.17	11,316,204.17
Assets Revaluation Surplus - Computer		4,345,818.04	938,717.46
Assets Revaluation Surplus - Office Furniture		2,175,824.67	2,175,824.67
Assets Revaluation Surplus - Building		118,184,856.80	118,184,856.80
Accumulated Surplus / (Deficit)		(30,249,961.19)	(13,488,369.32)
TOTAL EQUITY		264,821,077.66	293,821,322.85
LIABILITIES			
NON-CURRENT LIABILITIES			
Provision for Gratuity Fund	26	39,869,595.50	40,245,992.00
TOTAL NON-CURRENT LIABILITIES		39,869,595.50	40,245,992.00
CURRENT LIABILITIES			
Payables	27	12,623,063.26	39,595,364.53
TOTAL CURRENT LIABILITIES		12,623,063.26	39,595,364.53
TOTAL LIABILITIES		52,492,658.76	79,841,356.53
TOTAL EQUITY AND LIABILITIES		317,313,736.42	373,662,679.38

The accounting policies and notes from page 05 To 20 an integral part of these Financial Statements.

These Financial Statements are in compliance with the requirements of the Sri Lanka Public Sector Accounting Standards (SLPSAS).


I.M. N.P. Illangasinghe
Accountant/HOD - Finance


R.K.A.P. Ramanayake
Additional Director (Admin & Finance)

The Board of Directors is responsible for the preparation and presentation of these financial Statements.
These Financial Statements were approved by the Board of Directors and Signed on their behalf.


H.M.A.P. Rathnayake
Director /CEO(Actg)


Prof. W.A. P. Weerakkody
Chairman

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
CASH FLOW STATEMENT FOR THE YEAR ENDED 31ST DECEMBER, 2022

	NOTES	2022 RS.	2021 RS.
CASH FLOWS FROM OPERATING ACTIVITIES			
Surplus /(Deficit)		(15,193,030.44)	(2,251,968.79)
Non - Cash Movements			
Depreciation		44,728,521.31	44,655,476.02
Amortization of Capital Grants		(20,803,474.95)	(30,123,943.36)
Asset Revaluation Loss		5,000.00	
Interest Income	10.1	(2,386,094.07)	(1,987,695.99)
Increase/(Decrease) in payables (Operating)	28	(26,972,301.27)	14,662,458.18
(Increase)/Decrease in other current assets (Receivables-Operating)	29	10,561,460.98	(22,253,449.30)
Net cash flows from operating activities		(10,059,918.44)	2,700,876.76
CASH FLOWS FROM INVESTING ACTIVITIES			
Purchase of Property, Plant and Equipment	30	(5,278,445.00)	(5,030,422.20)
(Increase)/Decrease non current assets	31	197,851.42	(222,358.72)
Net interest Received	10.1	2,386,094.07	1,987,695.99
Net cash from investing activities		(2,694,499.51)	(3,265,084.93)
CASH FLOWS FROM FINANCING ACTIVITIES			
Capital Grants	32	5,157,721.05	4,070,746.87
Increase/(Decrease) in Provisions for Gratuity Fund	33	(376,396.50)	2,269,247.50
Effect to Cash flow from Adjustments of Accumulated Surplus	34	(1,565,970.50)	984,971.72
Net cash flows from financing activities		3,215,354.05	7,324,966.09
Net increase/(decrease) in cash equivalents		(9,539,063.90)	6,760,757.92
Cash and cash equivalents at beginning of period	35	37,603,650.50	30,842,892.58
Cash and cash equivalents at end of period	36	28,064,586.60	37,603,650.50

The accounting policies and notes from page 05 To 20 an integral part of these Financial Statements.

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT

Attributable to owners of the controlling entity												
	Initiate capital	Funds from Gen. Trea.	Assets Revaluation Surplus - Vehicle	Assets Revaluation Surplus - Plant & Machinery	Assets Revaluation Surplus - Computer	Assets Revaluation Surplus - Office Furniture	Assets Revaluation Surplus - Building	Accumulated surpluses/(deficit ts)	Total net assets			
	Rs.	Rs.	Rs.					Rs.	Rs.			
B/B/F as at Dec.31, 2021	69,907,594.42	70,083,506.65	34,702,988.00	11,316,204.17	938,717.46	2,175,824.67	118,184,856.80	(13,488,369.32)	293,821,322.85			
									-			
Adjustments to the Opening Balance								(1,568,561.43)	(1,568,561.43)			
	69,907,594.42	70,083,506.65	34,702,988.00	11,316,204.17	938,717.46	2,175,824.67	118,184,856.80	(15,056,930.75)	292,252,761.42			
Change in net assets for 2022												
Capital Grants		5,157,721.05							5,157,721.05			
Amotization of Deffered Income		(20,803,474.95)							(20,803,474.95)			
Assets Revaluation Surplus					3,407,100.58				3,407,100.58			
Surplus / (Deficit) for the period								(15,193,030.44)	(15,193,030.44)			
Balance as at Dec. 31, 2022	69,907,594.42	54,437,752.75	34,702,988.00	11,316,204.17	4,345,818.04	2,175,824.67	118,184,856.80	(30,249,961.19)	264,821,077.66			

The accounting policies and notes from page 05 To 20 an integral part of these Financial Statements.

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT

NOTES TO THE FINANCIAL STATEMENTS

Accounting Policies

1 Reporting Entity

1.1 Corporate Information

Institute of Post Harvest Technology is a body corporate, established on 19th June 2000 by the Extraordinary Gazette of the Democratic Socialist Republic of Sri Lanka No.1137/10 under the provisions of the State Agricultural Corporations Act. No. 11 of 1972. And, Institute's name has been revised as " National Institute of Post Harvest Management" on 17th October 2018 by the Extraordinary Gazette of the Democratic Socialist Republic of Sri Lanka No.2093/26

1.2 Principal Activities and Nature of Operations

The Institute carrying out post harvest research and development activities pertaining to cereals, pulses, oil seeds, other field crops, fruits, vegetables and spice crops.

1.3 Approval of Financial Statements by the Board of Directors

The Financial Statements of the Institute have been authorized for issue by the Board of Directors

2. Basis of Preparation

2.1 Statement of Compliance

The Financial Statements of the Institute have been prepared and presented in accordance with Sri Lanka Public Sector Accounting Standards (SLPSAS).

2.2 Responsibility of Financial Statements

The Board of Directors is responsible for the preparation and fair presentation of the Financial Statements of the Institute as per the Sri Lanka Public Sector Accounting Standards.

The Board of Directors acknowledges this responsibility in the Statement of Financial Position of the Institute.

2.3 Basis of Measurement

The Financial Statements have been prepared on the historical cost basis.

2.4 Functional and Presentation of Currency

The Financial Statements are presented in Sri Lankan Rupees which is the Institute's functional and presentation currency except when otherwise indicated.

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

2.5 Presentation of Financial Statements

The assets and liabilities of the Institute presents in its Statement of Financial Position are grouped by nature and listed in an order that reflects their relative liquidity and maturity pattern. No adjustments have been made for inflationary factors affecting the Financial Statements.

2.6 Materiality and Aggregation

Each material class of similar items is presented separately in the Financial Statements. Items of dissimilar nature or function are presented separately unless they are immaterial as permitted by Sri Lanka Public Sector Accounting Standards SLPSAS 1 'Presentation of Financial Statements'.

2.7 Offsetting

Assets and liabilities and income and expenses are not set-off unless permitted by the Sri Lanka Public Sector Accounting Standards.

2.8 Significant Accounting Judgements, Estimates and Assumptions

2.8.1 Going Concern

The Institute's management has made an assessment of its ability to continue as a going concern and is satisfied that it has the resources to continue in operations for the foreseeable future. Furthermore, management is not aware of any material uncertainties that may cast significant doubt upon the Institute's ability to continue as a going concern. Therefore, the Financial Statements continue to be prepared on the going concern basis.

2.8.2 Useful Lifetime of the Property Plant and Equipment

Useful economic lives of Property, Plant and Equipment are estimated as disclosed in Note 3.1 to the Financial Statements.

3. Significant Accounting Policies - Recognition of Asset and Liabilities

Accounting policies set out below have been applied consistently to all periods presented in the Financial Statements of the Institute unless otherwise indicated. Further, comparative year's information has been presented.

3.1 Property Plant & Equipment

Property, plant and equipment are tangible items that are held for use in the production or supply of goods or services, for rental to others or for administrative purposes and are expected to be used during more than one period. The Institute applies the requirements of Sri Lanka Public Sector Accounting Standard – SLPSAS 7 - 'Property, Plant and Equipment' in accounting for these assets.

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

Basis of Recognition

Property, Plant and Equipment are recognised if it is probable that future economic benefits service potential associated with the asset will flow to the Institute and the cost of the asset can be reliably measured. The institute policy recognition of property, plant and equipment is the value higher than Rs.5000. But Library books are recognised even less than Rs.5000.

Measurement

An item of Property, Plant and Equipment that qualifies for recognition as an asset is initially measured at its cost. Cost includes expenditure that is directly attributable to the acquisition of the asset. The cost of self constructed assets includes the cost of materials and direct labour, any other costs directly attributable to bringing the asset to a working condition for its intended use and the costs of dismantling and removing the items and restoring the site on which they are located. Purchased software that is integral to the functionality of the related equipment is capitalised as part of computer equipment. When parts of an item of property or equipment have different useful lives, they are accounted for as separate items (major components) of property and equipment.

Cost Model

The Institute applies cost model to all Property, Plant and Equipment, and records at cost of purchase or construction together with any incidental expenses there on less accumulated depreciation and any accumulated impairment losses. Such cost includes the cost of replacing part of the equipment when that cost is incurred, if the recognition criteria are met.

Revaluation Model

After recognition as an asset, an item of property, plant and equipment whose fair value can be measured reliably shall be carried at a revalued amount, being its fair value at the date of the revaluation less any subsequent accumulated depreciation and subsequent accumulated impairment losses. Revaluation shall be made with sufficient regularity to ensure that carrying amount does not differ materially from that which would be determined using fair value at the reporting date.

Subsequent Cost

The subsequent cost of replacing a component of an item of Property, Plant and Equipment is recognised in the carrying amount of an item, if it is probable that the future economic benefits embodied within that part will flow to the Institute and it can be reliably measured. The costs of the day-to-day servicing of Property, Plant and Equipment are charged to the statement of Financial Performance as incurred. Costs incurred in using or redeploying an item is not included under carrying amount of an item.

Depreciation

Depreciation is recognised in profit or loss on a straight-line basis over the estimated useful lives each part of an item of Property and Equipment since this method most closely reflects the expected pattern of consumption of the future economic benefits embodied in the asset. Amortization is done for computer software. Freehold land is not depreciated. Depreciations are calculated according to the days assets are used in purchasing year. GRN date is considered as purchasing date. The new estimated useful life time are as follows:

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

<u>Asset Category</u>	<u>Period</u>	
	<u>Purchased</u>	<u>Revalued</u>
Building	40 Years	20 Years
Plant & Machinery	10Years	05 Years
Office Equipment	10 Years	05 Years
Lab & Research Equipment	10 Years	05 Years
Other Equipment	10 Years	05 Years
Furniture	10 Years	05 Years
Electrical & Other Fittings	10 Years	05 Years
Library Books	10 Years	05 Years
Computer & Accessories	4 Years	4 Years
Vehicles	5 Years	5 Years
Software	5 Years	5 Years

Assets Revaluation

Class of Computer & Accessories were revalued as at 31/12/2021.

Revalued amount of computers are shown in the books. Revaluation surplus was credited to Computer revaluation gain A/C. And accounted as at 31/12/2022. The adjustments for depreciations were done as well.

Assets Disposal

Tollaly depreciated assets which were not physically, sold and can not be identified were removed from the books.

3.2 Events after the Reporting Period

Events after the Reporting period are those events, favorable and unfavorable, that occur between the Reporting date and the date when the Financial Statements are authorized for issue. In this regard, all material and important events that occurred after the Reporting period have been considered and appropriate disclosures are made in the the Financial Statements where necessary.

3.3 Inventories

Inventories are valued at lower of cost and net realizable value. Cost is dertermined on the FIFO basis and includes expenses incurred in acquiring the inventories and bringing them to their existing location and condition.

3.4 Employee benefits

Defined contribution plans - Employees' Provident Fund and Employees' Trust Fund

All employees who are eligible for Employees' Provident Fund contribution and Employees' Trust Fund contribution are covered by relevent contribution funds in the line with respective statutes and regulations. Employees contribute 10% and, Institute contributes 12% and 3% of gross emoluments of employees to Employees' Provident Fund and Employees' Trust Fund respectively.

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

Defined Benefits Plan - Gratuity

A Defined Benefit Plan is a post-employment benefit plan other than a Defined Contribution plan as defined in Sri Lanka Accounting Standard LKAS19 on "Employee Benefits". The Institute is liable to pay retirement benefits under the Payment of Gratuity Act, No.12 of 1983. Provision has been made in the Financial Statements for retirement gratuity as Employee benefit liability after the one year of service for all employees. Gratuity plan defines an amount of benefit that an employee will receive on retirement, usually dependant on one or more factors such as years of service and compensation. The liability recognised in respect of employee benefit liability in the Statement of Financial position is the present value of the defined benefit obligation at the reporting date together with adjustments for unrecognized past service costs. The employee benefit liability is calculated annually.

3.5 Provisions

Provisions are recognised if, as a result of a past event the institute has a present legal or constructive obligation that can be estimated reliably and it is probable that an outflow of economic benefit will be required to settle the obligation. Provisions and liabilities are recognised in the Statement of Financial Position.

4. Significant Accounting Policies - Income and expense

4.1 Revenue Recognition

Revenue is recognised to the extent that it is probable that the economic benefits will flow to the Institute and such revenue can be reliably measured. All Government and other grants are recognised initially as Recurrent Grant and are then transferred into the Capital Grant which used for Capital needs. The Capital Grants are recognised initially as deferred income and are then recognised in profit or loss as Amortization of deferred income on a systematic basis over the useful life of the assets. Average useful life time is considered as 7 years.

4.2 Borrowing Cost

All borrowing costs are expensed in the period in which they occur. Borrowing costs consist of interest and other costs that an entity incurs in connection with the borrowing of funds.

4.3 Tax Expense

As per the Sri Lanka Accounting Standard-LKAS 12 on 'Income Taxes', tax expense (tax income) is the aggregate amount included in determination of profit or loss for the period in respect of current and deferred taxes. Income tax expense is recognized in the Statement of Financial Performance except to the extent it relates to items recognised directly in equity or in Other Comprehensive Income (OCI), in which case it is recognised in equity or in OCI.

4.4 Research and Development Expenses

Research and Development expenses are allocated from capital budget. But Capital nature expenses are only recognised as assets. Recurrent nature expenses are charged to income statement. Salary arrears & arrears research allowances payments are considered expenses for the relevant year.

5. Statement of Cash Flow

The Statement of Cash Flow has been prepared by using the 'Indirect Method', in accordance with Sri Lanka Public Sector Accounting Standards – SLPSAS 2 on 'Cash Flow Statements'

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

		2022 (Rs.)	2021 (Rs.)
6	General Treasury Fund - Recurrent -PE -OR	102,200,000.00 26,933,778.95 <u>129,133,778.95</u>	 <u>125,035,378.13</u>
7	Transfers from Other Agencies		
	MOA - For Research Projects		
	Per. Evaluation of Washing Equi	-	154,734.25
	Mitigating Rice Stickiness	-	122,928.80
	Investigation of Nutritional	-	9,060.00
	Enha. of Quality Characteristic	-	197,613.38
		-	<u>484,336.43</u>
	MOA - Development Projects		
	17-2-10 · Introduction of Safe Packaging	15,303,222.00	28,790,791.24
	17-2-11 · Dev. a Tec.Sou.Rea.Dis. Network	383,519.56	5,303,933.83
	17-2-12 · Dev.Cott.le.Rice Proce.Industry	45,248.00	4,205,841.15
	17-2-13 · Establi.pulse de-hulling units	712,147.31	856,007.58
	17-2-14 · Dv. of on farm storade faciliti	14,012.33	1,747,423.00
	17-2-15 · Estab.Seconddry Processing Cent	1,740,168.00	2,170,488.94
	17-2-16 · Intro.Spice Proce. micro enterp	135,900.00	1,053,459.97
	17-2-17 · Establishment of medium scale	50,282.00	28,080.00
	17-2-18 · Upgrading the Laboratory Facili	-	56,385.00
		<u>18,384,499.20</u>	<u>44,212,410.71</u>
		<u>18,384,499.20</u>	<u>44,696,747.14</u>
8	Amortization of Capital Grants	<u>20,803,474.95</u>	<u>30,123,943.36</u>
9	Self Generated Income		
	Machinary Sales - Parboiling Vessels - GP	84,298.50	114,559.50
	Machinary Sales - Puls dehuler -GP	-	9,587.00
	Hostel Income - Accomodation 9.1	2,890,150.00	1,441,700.00
	Hostel Income - Food & Beverage 9.2	878,992.19	407,660.20
	Training Program 9.3	263,337.03	226,241.38
	Consultancy fees 9.4	2,468,511.54	567,329.00
	Auditorium fees 9.5	2,069,940.00	333,000.00
	Income from Laboratory Services 9.6	819,271.43	518,748.25
	Sale of Publications	9,980.00	1,755.00
	Income from Garden	2,119.00	1,400.00
		<u>9,486,599.69</u>	<u>3,621,980.33</u>
10	Other Income		
	Interest Income 10.1	2,386,094.07	1,987,695.99
	House Rent	393,924.49	428,000.00
	General Income	375,609.62	1,394,010.50
	No Pay	-	245,963.85
	Foreign Exchange Gain	943.18	2,485.69
		<u>3,156,571.36</u>	<u>4,058,156.03</u>

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

	2022	2021
	(Rs.)	(Rs.)
9.1 Hostel Income - Accomodation		
Income - External	2,890,150.00	1,247,800.00
- Internal	-	193,900.00
	<u>2,890,150.00</u>	<u>1,441,700.00</u>
Expenditure	-	-
	2,890,150.00	1,441,700.00
9.2 Hostel Income - Food & Beverage		
Income - External	4,521,193.50	823,126.00
- Internal	135,414.00	495,753.00
	<u>4,656,607.50</u>	<u>1,318,879.00</u>
Expenditure - External	3,664,228.26	594,106.40
- Internal	113,387.05	317,112.40
	<u>3,777,615.31</u>	<u>911,218.80</u>
	878,992.19	407,660.20
9.3 Training Program		
Income	420,395.00	406,680.50
Expenditure	157,057.97	180,439.12
	<u>263,337.03</u>	<u>226,241.38</u>
9.4 Consultancy fees		
Income	3,196,127.00	1,524,535.00
Expenditure	727,615.46	957,206.00
	<u>2,468,511.54</u>	<u>567,329.00</u>
9.5 Auditorium Fees		
Income - External	2,116,940.00	225,000.00
- Internal	84,000.00	108,000.00
	<u>2,200,940.00</u>	<u>333,000.00</u>
Expenditure	131,000.00	-
	<u>2,069,940.00</u>	<u>333,000.00</u>
9.6 Income From Lab Services		
Income	940,240.14	620,680.00
Expenditure	120,968.71	101,931.75
	<u>819,271.43</u>	<u>518,748.25</u>
10.1 Interest Income		
NSB Fixed Deposit & Savings	1,822,798.66	1,423,767.52
Interest Income Other		
Special advance Interest	5,842.64	9,732.84
Distress Loan Interest	514,207.57	508,894.22
Special Loan Interest	43,245.20	45,301.41
	<u>563,295.41</u>	<u>563,928.47</u>
	2,386,094.07	1,987,695.99

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

EXPENSES		2022	2021
		(Rs.)	(Rs.)
11 Wages,salaries and employee benefits			
Salaries & Wages - Permanent staff	65,708,217.02	59,587,563.54	
- Casual staff	2,897,186.07	1,993,786.34	
Cost of Living	11,681,930.00	11,990,680.00	
E.P.F.	8,526,546.17	8,617,464.12	
E.T.F.	2,137,024.10	2,155,128.37	
Research Allowances	975,411.50	1,536,860.85	
Professional Allowance	2,345,950.00	2,534,400.00	
Overtime and Holiday Pay	1,635,656.50	2,309,722.39	
Other allowance	249,000.00	165,000.00	
Gratuity	3,652,028.00	3,176,912.50	
	99,808,949.36	94,067,518.11	
12 Supplies and consumables used			
Printing and Stationery	1,228,486.86	1,107,603.35	
Office Needs & Sundry expenses	1,000,949.25	979,467.61	
Consumable for Research projects	115,556.97	60,351.00	
Consumable for Laboratory	290,441.67	127,235.50	
Lab Equipment Maintenance	1,176,317.68	1,722,211.48	
Running expenses of Hostel and kitchen	365,441.52	253,430.46	
Fuel & Running expenses - vehicles & Other	4,938,244.62	3,580,001.69	
Vehicles maintenance	3,290,113.60	2,506,568.83	
Buildings Maintenance	3,133,329.80	2,988,440.40	
Machinery Maintenance	1,207,438.14	1,100,674.14	
	16,746,320.11	14,425,984.46	
13 Depreciation			
Buildings	10,071,711.22	10,065,270.99	
Plant & Machinery	3,266,325.33	3,217,586.56	
Office Equipment	573,692.46	553,994.64	
Laboratory & Research Equipment	14,433,363.37	13,825,376.41	
Other Equipment	5,169,550.95	5,168,569.15	
Furniture & Fittings	1,619,175.87	1,619,175.87	
Electric & Other Fittings	56,547.22	53,588.71	
Computer & Accessories	1,130,256.79	1,762,496.69	
Library Books	106,149.83	106,149.83	
Vehicles	8,018,100.00	8,018,100.00	
Software	283,648.27	265,167.17	
	44,728,521.31	44,655,476.02	

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

	2022	2021
	(Rs.)	(Rs.)
14 Travelling Expenses - Domestic	410,626.50	425,775.51
Travelling Expenses - Foreign	29,888.00	-
Staff Tea	893,880.00	603,226.00
Periodicals, journals and news papers	50,260.00	43,680.00
Seminars	10,000.00	5,160.00
Training Programs	11,768.00	2,710.00
Supply & Value Chain	38,609.45	-
Establishment of Medium Scale	54,210.24	
Entertainment	200,107.36	167,560.67
Contract Labour	43,465.00	65,100.00
Insurance and licenses	643,741.92	451,185.95
Telecommunication	3,298,990.39	2,624,419.50
Postal charges	190,560.00	199,100.00
Electricity	2,161,408.55	1,601,693.13
Water,	1,019,995.16	854,675.84
Rent	146,445.00	711,880.00
Rates and Taxes	224,070.59	204,726.10
Publicity	4,752.45	-
Human Resources Development	103,569.00	291,652.90
Audit fees	402,000.00	54,200.00
Uniform Allowances	232,000.00	232,000.00
Transport	15,940.00	50,600.00
Cleaning Service	10,400.00	60,600.00
Security Service	2,617,100.00	2,595,500.00
	12,813,787.61	11,245,445.60
14.1 Assets Revaluation Loss	5,000.00	
15 Project Expenses		
MOA - For Research Projects		
Per. Evaluation of Washing Equi	-	154,734.25
Mitigating Rice Stickiness	-	122,928.80
Investigation of Nutritional	-	9,060.00
Enha. of Quality Characteristic	-	197,613.38
	-	484,336.43

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

	2022	2021
	(Rs.)	(Rs.)
General Treasury - For Research Projects		
12-6101 · Dev.scie.based protocol for PH	103,013.45	149,772.08
12-6103 · Postharvest loss assessment	1,097,508.76	45,923.53
12-6104 · Economic Analysis at Different	237,324.33	-
12-6105 · Design & deve. of monkey & bat	187,603.96	3,000.00
12-6106 · Reduction of Postharvest Losses	119,255.00	137,773.00
12-6107 · Potential of substituting wheat	26,491.00	49,393.04
12-6108 · Effect of Carbohydrate Profile	136,799.40	19,005.00
12-6109 · Servay on Rice mills & other ag	222,258.35	19,237.00
12-6110 · Design & deve.process line for	58,110.06	245,378.80
12-6111 · Potential applications of natur	51,016.00	
12-6112 · Characterization of alternative	81,099.60	
12-6113 · Stu feasi & design a ventilated	500,350.07	
12-6115 · Solar assisted dryer for drying	249,795.00	
12-6116 · Identification of currently ava	58,254.99	
12-6117 · Comparison of air conditioned	74,240.73	
12-6118 · using low temperature storage	286,895.27	
12-6119 · Effect of different post-harves	150,906.03	
	3,640,922.00	669,482.45

MOA- Development Projects

18-2-10 · Introduction of Safe Packaging	15,303,222.00	28,790,791.24
18-2-11 · Dev. a Tec.Sou.Rea.Dis. Network	383,519.56	5,303,933.83
18-2-12 Dev.Cott.le.Rice Proce.Industry	45,248.00	4,205,841.15
18-2-13 · Establi.pulse de-hulling units	723,432.31	856,007.58
18-2-14 · Dv. of on farm starage faciliti	14,012.33	1,747,423.00
18-2-15 · Estab.Secondry processing cente	1,740,168.00	2,170,488.94
18-2-16 · Intro.spice proce.micro enterpr	135,900.00	1,053,459.97
18-2-17 · Establishment of medium scale	50,282.00	28,080.00
18-2-18 · Upgrading the Laboratory Facili	-	56,385.00
	18,395,784.20	44,212,410.71
	22,036,706.20	45,366,229.59

16 Finance Costs

18,670.00	27,520.00
18,670.00	27,520.00

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

17.1 Property Plant and Equipments

Description	Building	Plant & Machinery	Office Equipment	Lab. & Research Equipment	Other Equipment	Furniture	Electric & Other Fittings	Library Books	Computer & Accessories	Vehicles	Total
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Balance at the beginning of the period	201,568,448.80	17,884,159.99	4,662,274.75	87,661,061.82	41,306,950.38	9,699,114.14	414,046.83	2,534,226.81	7,159,933.80	40,090,500.00	412,950,717.32
Adjustments to Opening Balance			(48,999.60)						48,999.60		
Additions during the year		11,750.00		4,941,460.00	79,635.00		36,100.00		73,500.00		5,142,445.00
Revaluation									4,502,098.40		4,502,098.40
Written off during the year									(7,208,933.40)		(7,208,933.40)
Balance at the end of the year	201,568,448.80	17,865,909.99	4,613,275.15	92,602,521.82	41,386,585.38	9,699,114.14	450,146.83	2,534,226.81	4,575,598.40	40,090,500.00	415,386,327.32
Accumulated Depreciation											
Balance at the beginning of the year	10,065,270.99	12,581,726.26	1,990,998.51	51,243,100.83	19,836,629.44	6,249,328.86	198,830.07	1,874,259.58	6,105,847.94	31,962,200.00	142,108,192.48
Adjustments to Opening Balance			(496.71)						3,087.64		2,590.93
Charge for the year	10,071,711.22	3,266,325.33	573,692.46	14,433,363.37	5,169,550.95	1,619,175.87	56,547.22	106,149.83	1,130,256.79	8,018,100.00	44,444,873.04
Written off during the year									(6,108,935.58)		(6,108,935.58)
balance at the end of the year	20,136,982.21	15,848,051.59	2,564,194.26	65,676,464.20	25,006,180.39	7,868,504.73	255,377.29	1,980,409.41	1,130,256.79	39,980,300.00	180,446,720.87
Carrying value as at 31st December 2022	181,431,466.59	2,017,858.40	2,049,080.89	26,926,057.62	16,380,404.99	1,830,609.41	194,769.54	553,817.40	3,445,341.61	110,200.00	234,939,606.45

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

	2022 (Rs.)	2021 (Rs.)
17.2 Intangible Assets		
<u>Computer Software</u>		
Gross Carrying Value at the beginning	1,325,835.84	
Additions	136,000.00	
Gross Carrying Value at the End	<u>1,461,835.84</u>	
Accumulated Amortization at the beginning	587,334.34	
Amortization for the year	283,648.27	
Accumulated Amortization at the end	<u>870,982.61</u>	
Net Carrying Value at the End	<u>590,853.23</u>	
18 Investments - Deposits		
National Saving Bank 2- 0001- 21-28195 -H/O	10,000,000.00	10,000,000.00
National Saving Bank 2- 0001- 21-28187 -H/O	10,000,000.00	10,000,000.00
	<u>20,000,000.00</u>	<u>20,000,000.00</u>
19 Other Non - Current Assets		
Distress Loan	13,344,798.21	13,578,502.51
Special Loan	1,120,832.51	1,084,979.63
	<u>14,465,630.72</u>	<u>14,663,482.14</u>
20 Cash & Cash Equivalents		
Bank of Ceylon - Torinton	-	529,671.51
People's Bank -Anuradhapura	16,409,608.45	26,860,703.62
National Saving Bank 1- 0005- 04-9129-2-Anuradhapura	956,648.49	926,520.89
National Saving Bank 1- 0001- 07-3208-7-H/O	10,698,329.66	9,286,754.48
	<u>28,064,586.60</u>	<u>37,603,650.50</u>
21 Receivables		
Debtors Control Account	488,358.39	488,358.39
Accrued Income	4,363,579.28	1,725,068.26
	<u>4,851,937.67</u>	<u>2,213,426.65</u>
21.1 Debtors Control Account		
Others	488,358.39	488,358.39
	<u>488,358.39</u>	<u>488,358.39</u>
21.2 Receivables		
Accrued Income - General	199,630.00	199,630.00
Accrued Interest Income	703,561.64	322,465.76
Income Receivable	2,897,460.72	660,762.50
Income Receivable - Before 31/12/2018	37,410.00	37,410.00
Receivables from Mahaweli Project	504,800.00	504,800.00
House Rent Receivables	20,716.92	-
	<u>4,363,579.28</u>	<u>1,725,068.26</u>

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

	2022 (Rs.)	2021 (Rs.)
22 Inventories		
Paddy-Research projects	101,500.00	101,500.00
Machin Fabrication - Raw material	153,791.00	156,416.00
Diesel - Generator	6,448.00	7,072.00
Stationary Stock	995,362.93	506,435.50
Consumable Stock	175,472.24	89,701.75
Chemical Stock	4,573,003.78	4,119,237.83
Parboiling Vessels Stock	12,980.00	266,090.00
Plastic Cr. Stock - Before 2020	164,876.80	164,876.80
Plactic Crate Stock-From 2020	183,535.20	232,297.20
Plastic Crate Stock-From 2021	4,849,416.00	20,483,388.00
DP Pul dehul. ma. raw ma. Stock	828,885.86	1,176,383.17
Puls dehul. Machines	675,171.84	-
Computer parts	205,000.00	-
Other Consumables	598,435.17	-
Free Issuing Equipment	315,252.00	-
	13,839,130.82	27,303,398.25
23 Advances		
Festival	40,000.00	46,250.00
Traveling	33,138.90	33,138.90
Special Advance	6,800.00	9,200.00
Interim Advance - Head Office	17,106.60	17,106.60
	97,045.50	105,695.50
24 Other current assets		
Services	-	192,000.00
Recoverable Salary for No Pay	22,889.32	-
Prepaid Expenses	442,056.11	-
	464,945.43	192,000.00
25 Equity		
Initiate Capital	69,907,594.42	69,907,594.42
General Fund - Capital	54,437,752.75	70,083,506.65
Assets Revaluation Surplus - Vehicle	34,702,988.00	34,702,988.00
Assets Revaluation Surplus - Plant & Machinery	11,316,204.17	11,316,204.17
Assets Revaluation Surplus - Computer	4,345,818.04	938,717.46
Assets Revaluation Surplus - Office Furniture	2,175,824.67	2,175,824.67
Assets Revaluation Surplus - Building	118,184,856.80	118,184,856.80
Accumulated Surplus / (Deficit)	(30,249,961.19)	(13,488,369.32)
	264,821,077.66	293,821,322.85
26 Provision For Gratuity Fund		
Gratuity fund	39,869,595.50	40,245,992.00
	39,869,595.50	40,245,992.00

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

		2022 (Rs.)	2021 (Rs.)
Current Liabilities			
27 Payables			
Advances	27.1	1,811,394.22	1,784,706.02
Accrued Expenses	27.2	3,951,090.92	4,175,559.21
Deposits	27.3	27,500.00	108,500.00
Retention	27.4	478,964.26	358,398.13
Creditors Control Account	27.5	6,354,113.86	33,168,201.17
		12,623,063.26	39,595,364.53
27.1 Advances - EPF		1,351,558.91	1,337,236.31
- ETF		184,303.48	182,350.42
- Stamp Fees		9,475.00	9,825.00
- Payee		4,200.00	1,200.00
Salary Control A/C		261,856.83	254,094.29
		1,811,394.22	1,784,706.02
27.2 Accrued Expenses -			
-Accrued Expenses- General		3,346,648.35	2,921,359.21
-Provisions for Audit Expenses		500,000.00	1,254,200.00
- Salary Payable		104,442.57	
		3,951,090.92	4,175,559.21
27.3 Deposits			
Tender - R&D		27,500.00	108,500.00
		27,500.00	108,500.00
27.4 Retention			
Contract Works		478,964.26	358,398.13
		478,964.26	358,398.13
27.5 Plastic crates-Fund - Before 31/12/2018		-	3,900.00
New Plastic Crates Fund		90,560.00	11,130,530.00
50% Contribution of DP		270,000.00	374,000.00
Re. Fund for Non-Distributed PC		4,849,416.00	20,483,388.00
Re.Fund for Pul. Dehulr Project		828,885.86	1,176,383.17
Re.Fund for Free Issuing Equipment		315,252.00	-
		6,354,113.86	33,168,201.17

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

		2022 (Rs.)	2021 (Rs.)
28 Payables			
Advances	27.1	1,811,394.22	1,784,706.02
Accrued Expenses	28.1	3,951,090.92	4,175,559.21
Deposits	27.3	27,500.00	108,500.00
Retention	27.4	478,964.26	358,398.13
Creditors Control Account	27.5	6,354,113.86	33,168,201.17
		12,623,063.26	39,595,364.53
Balance as at 1.1.2022		39,595,364.53	24,932,906.35
Less : Balance as at 31.12.2022		12,623,063.26	39,595,364.53
Increase / (Decrease) Liabilities		(26,972,301.27)	14,662,458.18
28.1 Accrued Expenses	27.2	3,951,090.92	4,175,559.21
Less :- Non-trade creditors		-	-
Trade Creditors		3,951,090.92	4,175,559.21
29 Current Assets			
Stocks	22	13,839,130.82	27,303,398.25
Advances	23	97,045.50	105,695.50
Other Current Assets	24	464,945.43	192,000.00
Debtors Control Account	21.1	488,358.39	488,358.39
Accrued Income	29.1	4,363,579.28	1,725,068.26
		19,253,059.42	29,814,520.40
Balance as at 1.1.2022		29,814,520.40	7,561,071.10
Less : Balance as at 31.12.2022		19,253,059.42	29,814,520.40
Increase / Decrease Current Assets		(10,561,460.98)	22,253,449.30
29.1 Accrued Income	21.2	4,363,579.28	1,725,068.26
Less :- Non-trade Receivables		-	-
Trade Receivables		4,363,579.28	1,725,068.26
30 Property, Plant and Equipment			
Additions during the year		5,278,445.00	207,400,822.20
Less :- Assets acquired on credit basis		-	-
Less :- Assets Received as a grant			(1,070,400.00)
Less :- Assets Revalued			(201,300,000.00)
Assets acquired on cash basis		5,278,445.00	5,030,422.20
31 Investment - Deposits			
National Saving Bank 2- 0001- 21- 28195 -H/O		10,000,000.00	10,000,000.00
National Saving Bank 2- 0001- 21- 28187 -H/O		10,000,000.00	10,000,000.00
		20,000,000.00	20,000,000.00
Distress Loan		13,344,798.21	13,578,502.51
Special Loan		1,120,832.51	1,084,979.63
		14,465,630.72	14,663,482.14
Total Non - Current Assets		34,465,630.72	34,663,482.14
Balance as at 1.1.2022		34,663,482.14	34,441,123.42
Less : Balance as at 31.12.2022		34,465,630.72	34,663,482.14
Increase / Decrease Non Current Assets		(197,851.42)	222,358.72

NATIONAL INSTITUTE OF POST HARVEST MANAGEMENT
NOTES TO THE FINANCIAL STATEMENTS

		2022 (Rs.)	2021 (Rs.)
32	Capital Nature Funds Received	5,157,721.05	4,070,746.87
	Less :- Fund Receivables	-	-
		<u>5,157,721.05</u>	<u>4,070,746.87</u>
33	Non- Current Liabilities		
	Provision For Gratuity Fund		
	Balance as at 1.1.2022	40,245,992.00	37,976,744.50
	Less : Balance as at 31.12.2022	39,869,595.50	40,245,992.00
	Increase / (Decrease) Liabilities	<u>(376,396.50)</u>	<u>2,269,247.50</u>
	Effect to Cash flow from		
	Adjustments of Accumulated		
34	Surplus		
	to Accumulated Surplus	<u>(1,565,970.50)</u>	<u>984,971.72</u>
	Cash & Cash equivalents at the		
35	beginning of period		
	Cash at Bank		
	Bank of Ceylon - Torinton	529,671.51	529,671.51
	People's Bank -Anuradhapura	26,860,703.62	21,523,613.22
	National Saving Bank 1- 0005- 04- 9129-2-Anuradhapura	926,520.89	894,706.34
	National Saving Bank 1- 0001- 07- 3208-7-H/O	9,286,754.48	7,894,901.51
	Cash & Cash equivalents as at		
	01.01.2021	<u>37,603,650.50</u>	<u>30,842,892.58</u>
	Cash & Cash equivalents at the		
36	ending of period		
	Cash at Bank		
	Bank of Ceylon - Torinton	-	529,671.51
	People's Bank -Anuradhapura	16,409,608.45	26,860,703.62
	National Saving Bank 1- 0005- 04- 9129-2-Anuradhapura	956,648.49	926,520.89
	National Saving Bank 1- 0001- 07- 3208-7-H/O	10,698,329.66	9,286,754.48
	Cash & Cash equivalents as at		
	31.12.2022	<u>28,064,586.60</u>	<u>37,603,650.50</u>
37	Machinery stock for the demonstration purpose is at Cost		<u>2,149,740.00</u>
38	The initiate Capitals of the INSTITUTE OF POST HARVEST TECHNOLOGY shown		
	Rs 500,000,000.00		
39	Capital Grants recognised as amotization of deffered income on sytematic basis over 7 years .		
	Previous years adjustments were done through accumulated surplus account. Current year		
	adjustment was done against profit or loss.		

The Chairman
National Institute of Post Harvest Management

Report of the Auditor General on the Financial Statements and Other Legal and Regulatory Requirements of the National Institute of Post Harvest Management for the year ended 31 December 2022 in terms of Section 12 of the National Audit Act, No. 19 of 2018.

The above Report is sent herewith.

W.P.C. Wickramaratne
Auditor General

Copy: 1. Secretary - State Ministry of Promoting the Production and Regulating the Supply of Organic Fertilizer , and Paddy and Grain, Organic Foods, Vegetables, Fruits, Chilies, Onion and, Potato Cultivation Promoting, Seed Production and Advanced Technology Agriculture

2. Secretary - Ministry of Finance

The Chairman
National Institute of Post Harvest Management

Report of the Auditor General on the Financial Statements and Other Legal and Regulatory Requirements of the National Institute of Post Harvest Management for the year ended 31 December 2022 in terms of Section 12 of the National Audit Act, No. 19 of 2018.

1. Financial Statements

1.1 Qualified Opinion

The audit of the financial statements of the National Institute of Post Harvest Management for the year ended 31 December 2022 comprising the statement of financial position as at 31 December 2022 and the statement of financial performance, statement of changes in equity and the cash flow statement for the year then ended, and the notes in relation with the financial statements, including a summary of significant accounting policies was carried out under my direction in pursuance of provisions in Article 154 (1) of the Constitution of the Democratic Socialist Republic of Sri Lanka read in conjunction with provisions of the National Audit Act No. 19 of 2018 and Finance Act No. 38 of 1971. My report to Parliament in pursuance of provisions in Article 154 (6) of the Constitution will be tabled in due course.

In my opinion, except for the effects of the matters described in the basis for Qualified Opinion section of my report, the accompanying financial statements give a true and fair view of the financial position of the National Institute of Post Harvest Management as at 31 December 2022 and of its financial functions and its cash flows for the year then ended in accordance with Sri Lanka Public Sector Accounting Standards .

1.2 Basis for Qualified Opinion

- (a) Although the contract retention amounted to Rs. 23,561 and deposits of contract guarantees amounted to Rs. 81,000 pertaining to the year 2018 should be credited to the government revenue in terms of F.R. 571 (2), as it was brought to accounts as a sundry income of the year under review, the deficit of the year had been understated by Rs. 104,561 .

- (b) As a stock of paddy which was not available in physical but taken for research purposes as at 31 December of the year under review valued at Rs. 101,500 had been shown in the financial statements, the stock balance of the year had been overstated by the same amount.
- (c) A number of 36 computer accessories bearing revalue amount of Rs. 695,190 as at 31 December 2017 and purchased as at 29 March 2018 for a Rs. 189,600 had been entirely depreciated by 31 December 2021. As these computers and accessories were further being used, they had not been revalued and adjusted in the accounts of the year under review.
- (d) Within the expenditure of salaries and wages of the year under review, the arrears payment of salaries of two officers amounted to Rs. 684,019 had been included. The expenditure pertaining to the preceding year included in the salaries and wages was Rs. 648,637. As this expenditure and the contribution to the Employees' Provident Fund amounting to Rs. 77,836 and the contribution to the Employees' Trust Fund amounting to Rs. 19,459 pertaining to said salaries and wages had been accounted for as an expenditure of the year without adjusting to the retained earnings, the deficit of the year had been overstated by Rs. 745,632.
- (e) As the payments in advance made for the insurance and license fees totalled to Rs. 194,420 had been brought to accounts as the expenditure of the current year, the deficit of the year had been overstated by the same amount and the current assets had been understated by the same amount.
- (f) As the two stock items purchased for the project requirements in the year 2018 totalled to Rs. 175,770 were not taken into the final stock balance, the current assets of the statement of financial position of the year under review had been understated by the same amount was observed at the checking of the stores by the audit officers on 20 April 2023.
- (g) At the time of the examination carried out by the audit officers on 20 April 2023, it was observed that the actions had not been taken to assess and adjust the value of 42 items that cannot be identified the date and the value of the items purchased.
- (h) As the expired 12 chemical items cost at Rs. 358,204 had been included in the final stock balance as a current asset in the statement of financial position, overstatement of the value of the final stock was observed at the time of checking the stock samples of the laboratory of the National Institute of Post Harvest Management.

I conducted my audit in accordance with Sri Lanka Auditing Standards (SLAuSs). My responsibilities, under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of my report. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my qualified opinion.

1.3 Other Information Included in the Annual Report 2022 of the National Institute of Post Harvest Management

The other information comprises the information included in the Annual Report 2022 of the National Institute of Post Harvest Management, but does not include the financial statements and my auditor's report thereon, which I have obtained prior to the date of this auditor's report. The Management is responsible for the other information.

My opinion on the financial statements does not cover the other information and I do not express any form of assurance conclusion thereon.

In connection with my audit of the financial statements, my responsibility is to read the other information identified above and, in doing so, consider whether the other information is materially inconsistent with the financial statements or my knowledge obtained in the audit or otherwise appears to be materially misstated.

If I conclude that there is a material misstatement in reviewing the Annual Report 2022 of the National Institute of Post Harvest Management, I am required to report that fact to those charged with governance for the correction purpose. If there are further uncorrected errors, they will be included in the report that I will table in Parliament in due course in accordance with Article 154 (6) of the Constitution

1.4 Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation of financial statements that give a true and fair view in accordance with Sri Lanka Public Sector Accounting Standards, and for such internal control as Management 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, Management is responsible for assessing the National Institute of Post Harvest Management's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless Management either intends to liquidate the Institute or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the National Institute of Post Harvest Management's financial reporting process.

As per Section 16(1) of the National Audit Act No. 19 of 2018, it is required to maintain proper books and records of all its income, expenditure, assets and liabilities, to enable annual and periodic financial statements to be prepared of the National Institute of Post Harvest Management.

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

My objective is 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 my opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Sri Lanka Auditing Standards 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 Sri Lanka Auditing Standards, I exercise professional judgment and maintain professional scepticism throughout the audit. I 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 my 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.
- Obtained 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.

- Evaluated the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the management.
- Concluded on the appropriateness of the Management's 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 National Institute of Post Harvest Management's ability to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify my opinion. My conclusions are based on the audit evidence obtained up to the date of my auditor's report. However, future events or conditions may cause the Institute to cease to continue as a going concern.
- Evaluated 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.

I communicate with those charged with governance regarding, among other matters, significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

2. Report on Other Legal and Regulatory Requirements

- 2.1 Specific provisions for following requirements are included in the National Audit Act, No. 19 of 2018 .
- 2.1.1 Except for the effects of the matters described in the basis for Qualified Opinion section of my report, I have obtained all the information and explanation that required for the audit and as far as appears from my examination, proper accounting records have been kept by the National Institute of Post Harvest Management as per the Section 12 (a) of the National Audit Act, No. 19 of 2018 .
- 2.1.2 The financial statements of the National Institute of Post Harvest Management presented is consistent with the preceding year as per the requirement of section 6 (1) (d) (iii) of the National Audit Act, No. 19 of 2018 .

- 2.1.3 The financial statements presented includes all the recommendations made by me in the previous year except the audit matters described in the basis for Qualified Opinion section of my report as per the requirement of Section 6 (1) (d) (iv) of the National Audit Act, No. 19 of 2018 .
- 2.1.4 Based on the procedures performed and evidence obtained were limited to matters that are material, nothing has come to my attention;
- 2.2.1 To state that any member of the governing body of the National Institute of Post Harvest Management has any direct or indirect interest in any direct or indirect interest in any contract entered into by the National Institute of Post Harvest Management which are out of the normal cause of business as per the requirement of Section 12 (d) of the National Audit Act, No. 19 of 2018 .
- 2.2.2 To state that the National Institute of Post Harvest Management has not complied with any applicable written law, general and special directions issued by the governing body of the National Institute of Post Harvest Management as per the requirement of Section 12 (f) of the National Audit Act, No. 19 of 2018 except for the observations appear below;

Reference to Laws , Rules/ Directives	Observation
(a) Financial Regulation of Democratic Socialist Republic of Sri Lanka	
i. F.R.759	Although out of the items included in the stock registers of the stores, at least a few categories of items should be checked monthly under the authority of the Accountant and recorded in the Treasury Format 127 and filed, it had not been so done.
ii. F.R. 880 (1) and F.R. 881	Although the securities should be kept in terms of Authority 612 of the Security Ordinance , the entity had not taken actions to get securities from any officer who had to give securities.

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|---|--|
| <p>(b) Paragraph 2.2.2 (b) xii of Public Administration Circular No. 01/2021 dated 16 November 2021</p> | <p>The material important matters consisted in the audit reports that were discussed in the Audit Committee held from 12 November 2021 to 31 December 2022 had not been reviewed in the Meetings of Board of Directors held in between aforesaid period or after that period of time.</p> |
| <p>(c) Establishments Code of Democratic Socialist Republic of Sri Lanka</p> | |
| <p>i. Section 4 of Paragraph XIX</p> | <p>The applications consisted of standard format with regard to government houses had not been used to get houses in terms of Establishments Code .</p> |
| <p>ii. Section 5.8 of Paragraph XIX</p> | <p>After repairing the Government House No.01 in the year 2017 by incurring Rs. 4,337,274, the aforesaid house had been handed over to the duty assigned Chairman of the Institute for residing from that year. Despite an authority to provide the facility of government house on free basis to the Chairman in this Institute had not been received, a sum of Rs. 2,477 as water bills and a sum of Rs. 3,284 as electricity charges for the year 2022 had been paid by the Institute and monthly economic rent income amounting to Rs. 3,000 had also been lost.</p> |
| <p>iii. Section 6.1 of Paragraph XIX</p> | <p>Even though it had been stated that the lease period of all the houses except for the houses entitled for a certain post should be 05 years, the entity had acted in contrary to that.</p> |

- 2.2.3 To state that the National Institute of Post Harvest Management had not been performed according to its powers, functions and duties as per the requirement of Section 12 (g) of the National Audit Act, No. 19 of 2018 except for the observation appear below;
- 2.2.4 To state that the resources of the National Institute of Post Harvest Management had not been procured and utilized economically, efficiently and effectively within the time frames and in compliance with the applicable laws as per the requirement of Section 12 (h) of the National Audit Act, No. 19 of 2018 except for the observation appear below;

2.3 Other Matters

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- (a) Even though a period for more than 04 years had elapsed for the Research Project of "Design & Construction Of A Tunnel Type Forced - Air Cooler For Cooling Of Fresh Mango" which was planned to be commenced on 01 January 2018 and to be completed by 31 December 2020 as a research project with a one year extension period, the construction materials and chemicals which had been purchased for that purpose valued at Rs. 543,338 were in idle due to the fact that the research was not in working condition even by the date of the audit by 24 February 2023. Similarly, the allocation of Rs. 348,000 received from the State Ministry of Agriculture for this Project in the year 2021 had been returned to the Ministry without being used.
- (b) Due to the inactivation of 02 Atomic Absorption Spectrophotometer and Handle Wheel Vertical Autoclave machines with a total value of Rs.8,336,705 in the laboratory by 31 December 2022, the research works done by using that machine had been stopped in the years 2018 and 2019 respectively. The Institute did not have a planned programme from the year 2020 to repair and use these machines.
- (c) The Gas Chromatograph Mass Spectrometer (GCMS) machine, which was purchased for Rs. 15,216,575 for laboratory research works in the year 2015 and is being operated in fully air-conditioned environment with an annual maintenance cost of Rs. 275,000 had remained unused and in idle even by 20 March 2023, the date of audit.
- (d) It is a major objective to produce and socialize innovation products after a research process by the Research Division operated in National Institute of Post Harvest Management.

However, it was observed at the audit examination carried out that the only one of the 19 types of new innovation machines that were unveiled according to the Register of Manufactured Machines and Equipment maintained at the mechanical workshop during the 23 years from the year 2000 to 20 March 2023 had been socialized.

- (e) Although after the submission of final report of the researches, the researches should be published in a recognized journal or presented at a conference in terms of the Research Guidelines, 20 Reported Researches submitted in the period from the year 2015 to the year 2022 had not been presented in a recognized journal or conference.
- (f) Although the final reports should be given within the stipulated time frame given for the researches, the final reports for 05 researches where the research timeline was completed, had not been provided even by 24 February 2023 the date of audit and the delay period had ranged from 02 to 05 years.
- (g) Due to the fact that the failure of taking sufficient actions in respect of the results found in 04 socially important research projects that have been commenced after 2015 and completed now to be socialized by other development projects or project offices, the objectives of those research projects had not been achieved.
- (h) Even though an allocation of Rs.770,000 had been made available for the project of development of NVQ level 3 and 4 certificate courses related to the operation of post-harvesting machines which was commenced in the year 2018 by the Engineering Department, only Rs. 178,062 had been spent for the preparation of the syllabus and organizational activities of the course. Although the courses were planned to be commenced before the end of 2018 under the aforementioned projects, they had not been commenced. As this was not included in the Action Plan in other years also, the Project had not been commenced up to now. Accordingly, as the intended objective of the Project had not been fulfilled so far, the amount spent had been an uneconomical expenditure.
- (i) Even though the main objective of the Research Department is to produce and socialize the innovations after a research process, the patent license had been obtained only for 09 machines and equipment from the year 2020 up to the date of audit.
- (j) The Paragraphs referred to the Committee on Public Enterprises held on 09 May 2019 regarding the performance of the Institute and the Decisions of the Committee had not been implemented even by 31 December 2022 .

Paragraph	Decision	Current Status
(i) Obtaining certification of that the laboratories are of International Standard ----- The laboratory of the Institute had been modernized by purchasing equipment at a cost of Rs.61.6 million in the year 2015 and due to lack of accreditation required to conduct research according to International Standards, the Committee had asked about the lack of acceptability for the research which are being conducted.	The Chairman has informed the Committee on Public Enterprises that they were working to get the necessary international recognition.	The institute had failed to get the necessary Accreditation even by 20 March 2023 .
(ii) Providing an official vehicle to an officer who does not own an official vehicle ----- The Committee inquired about the possibility of allocating a vehicle with 150 liters of fuel per month to a Non-executive Board Member who is not entitled to assign of an official vehicle as per a Circular of Ministry of Finance for the income promotion functions of the Institute.	To send a prepared report to the Committee within one month including the following information about the Director in question, • Qualifications of the respective officer • The work done by him using the respective vehicle	The Chairman, who accepted that a mistake had been made by the Institute had informed that the relevant vehicle has been returned to the Institute. Similarly, although the National Institute of Post Harvest Management has submitted relevant issues to the Ministry of Agriculture, requests had not been made to update the audit work.

- (j) Although the laboratory equipment required by the laboratories for the testing activities carry out by the National Institute of Post Harvest Technology Management has been purchased on limited basis, 03 equipment with a total value of Rs. 7,878,705 remained underutilized because of reducing the number of times that equipment is used. In this, it is observed that the decrease in the amount of researches conducted may lead to a decrease in the cases of using the equipment.
- (k) Since the Institute had not yet taken formal actions to review the audit observations indicated by the audit reports of the National Audit Office in the years prior to the reviewed year and settle, those observations were continuously shown in the audit reports. Details are shown below.
- (i) A major objective of the Institute was to reduce post-harvest damage to agricultural crops and, it had been identified that the post-harvest losses of non-perishable crops were between 30 and 40 per cent according to a preliminary survey conducted for that in 2009 . A 12 years of period had elapsed since the survey was conducted by the end of the year under review and being unavailable of a database by the Institute that can identify the percentage of post-harvest damage which had been reduced by the year 2022.
- (ii) Even though a sum of Rs. 9,572,715 had been spent to get the patent rights for the findings of the Induction Of Fruit Ripening By Organic Method Research which was implemented from 2016 to August 2019 and to popularize the results of the research at a commercial level, failure of the Project to be at an operational level by 24 February 2023, the date of audit.
- (iii) A number of 500 samples were tested at a cost of Rs. 1,956,120 in the year 2017 for the Project which was implemented to check whether 04 types of heavy metals had contained in 07 types of food imported under the National Food Production Programme using the provisions of the Ministry of Agriculture. According to the project report, it had been ascertained that the certain food items contain heavy metals such as Cadmium, Arsenic and Lead beyond the maximum safety level. Nevertheless, being the amount spent on research had become a useless expense due to the fact that the Institute had not conducted further inspection on the food items containing heavy metals and had not given instructions to all the responsible parties to take proper action in this regard.

- (iv) A number of 100 Gps Trackers units were purchased on 05 April 2018, at a cost of Rs.1,290,000 and a number of 130 Tempered Data Loggers were purchased on 22 March 2018 at a cost of Rs.4,680,000 for the Supply and Value Chain Management Project of Agricultural Crops in Sri Lanka, which was planned to be implemented during the period from 2017 to 2019 . A number of 72 GPS Trackers units and 09 Tempered Data Loggers had remained in the warehouse even by 28 January 2022 without being used. Being the amount of Rs. 7,292,332 spent for that project has become an uneconomical expenditure due to the fact that the relevant equipment has not been used effectively.
- (l) Even though the works had been commenced under the contract agreement with a company valued at Rs.1,528,818 for the modernization of quarters, the clauses regarding contract period, date of completion, recovery of penalties for delayed periods had not been included in the contract agreement. Even though the contract company requested an extension of the date for not being able to fulfill the relevant contract within the stipulated time and for that, the approval for the extension of the date up to 22 February 2022 had been given, a new performance guarantee had not been given to the National Institute of Post Harvest Management by extending the Performance Bond valued at Rs. 152,881 by one month . Likewise, the final payment of Rs. 6,737,134 had been made as per Financial Regulations 237 (a) without having any special certificate .
- (m) Out of the Secondary Level posts, 27 are approved Management Assistant posts and 22 are actual staff. While assigning the role to those officials, evaluating the overall performance to be performed by the Institute and the delegation of duties had not been carried out in a manner that reached a satisfactory level. Accordingly, to fill the vacant posts despite they are not assigned enough duties to perform during the duty period and being extended the days of service of two Management Assistants who were recruited on contract basis and one of the two officers was paid Rs.816,708 as salary for the period from October 2020 to 31 December 2022, and Rs.555,338 was paid as salary for the other officer for the period from August 2021 to December 2022. Similarly, the management had allowed two officers from management assistant officers who were working in the District Offices to stay at the same workplace for 17 years without being implemented a transfer procedure.
- (n) The extent of the role to be played by the Primary Level employees is determined by the number of higher level officers employed. With 26 per cent of the staff at Senior, Secondary and Tertiary Levels of the Institute being vacant, the role of non-vacant Primary Level employees had also been reduced and there was an excess staff.

- (o) In this situation, despite all the six guard posts approved for the security service were not vacant, a sum of Rs. 13,569,700 had been paid to the Department of Civil Security for obtaining the service of their officers for assigning three out of 06 officers holding guard positions to the security of the dormitory, and assigning of the remaining three to the office assistant position for the security service at the main gate for the period from February 2018 to 31 December 2022 according to the approved staff report.
- (p) The Management had decided on 15 July 2022, that the officers residing at a distance of more than 20 km from the Institute should be given quarters. due to the provision of related facilities in contrary to that decision to two permanent resident officers at a distance of less than 20 km, the officers mentioned in the waiting list had lost the said quarters facilities.
- (q) Although the assessment values provided by the Valuation Department for rents of official quarters should be valid for a period of two years for houses within the city limits and for a period of 03 years for official quarters outside the city limits, rents had been collected from the house owners based on the assessment values obtained by the Valuation Department in November 2010 without being re-valued the houses.
- (r) Three types of printed documents purchased in the years 2016 and 2017 with a total value of Rs.393,300 were piled up in an unsecured manner during the physical inspection of the warehouse premises on 27 February 2023 and since the old name of the Institute and the photos of politicians were printed on these documents, it was observed that the said documents were unsuitable for future use and therefore the said expenditure incurred was observed as an unnecessary expenditure.
- (s) It should be ensured that effective internal control systems are developed and maintained for the financial control of each entity and the effectiveness of that system should be reviewed from time to time as per 38 (1) (c) and 38 (2) of the National Audit Act No. 19 of 2018 and although a written copy thereof should have been submitted to the Auditor General, actions had not been taken to do so.

W.P.C. Wickramarathne
Auditor General .