
Performance Review Report for 2013-2015

PREPARED FOR
NATIONAL SCIENCE AND
TECHNOLOGY
COMMISSION

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The Contents

Abbreviations

Acknowledgements

Executive Summary

1. Introduction
 - 1.1 The Main Objectives
 - 1.2. The Organizational Structure and Human Resources

2. The Review Procedure
 - 2.1 The Panel and Review Procedure
 - 2.2 The Assessment
 - 2.3 The Report.

3. The Management Assessment
 - 3.1 Responses to External and Internal Environment in Planning Strategy
 - 3.2 Planning S & T Programs and Setting Priorities
 - 3.3 Planning S & T / R & D Projects
 - 3.4 Project Management and Maintenance of Quality
 - 3.5 Human Resources Management
 - 3.6 Management of Organizational Assets
 - 3.7 Coordinating and Integrating the Internal Functions/Units/Activities
 - 3.8 Managing Information Dissemination and Partnership
 - 3.9 Monitoring, Evaluation and Reporting

4. Output Assessment
 - 4.1. Technologies Developed
 - 4.2. Technologies Transferred to Industry/Entrepreneurs
 - 4.3. Information Dissemination/ Extension
 - 4.4. Research Publications
 - 4.5 Patents
 - 4.6. Services (Testing, Calibrations, Advisory and etc.)
 - 4.7 Trainings

5. Productivity
 - 5.1. Productivity of Institution Based on Outputs and S & T Staff Strength
 - 5.2. Overview of the Institution's Performance and Contribution to the National Development

- 6 Recommendations

List of Abbreviations

BoD	Board of Directors
CARP	Commission for Agriculture and Research Policy
FAO	Food and Agriculture Organization
GLC	Gas Liquid Chromatography
HPLC	High Pressure Liquid Chromatography
ILO	International Labour Organization
MIS	Management Information System
NASTEC	National Science and Technology Commission
RPRDC	Rice Processing Research and Development Centre
RPC	Research and Planning Committee
SME	Small and Medium Enterprises
SER	Self Evaluation Report
WFP	World Food Program
UNDP	United Nation Development Policy

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The Review Team appreciates the valuable inputs provided by the research staff, administrative staff, union leaders and the stakeholders during the discussions, which found to be quite useful in the preparation of the report.

Executive Summary

The Institute of Post Harvest Technology (IPHT) was established in 2000 by an extraordinary Gazette of the Democratic Socialist of Sri Lanka, No. 1137/10, under the provision of the State Agriculture Corporation Act No. 11 of 1972. It was originally the Rice Processing Research and Development Centre (RPRDC) of the Paddy Marketing Board, which was set up with FAO/UNDP assistance in 1976. At present IPHT is the foremost institute in Sri Lanka that conducts research and development pertaining to post harvest of field crops, rice and other grains, fruits and vegetables.

An independent panel of four members appointed by NASTEC with the consensus of IPHT conducted the institutional review during the period from March to May 2017. The general objective of the review was to assess how effectively the Institute has utilized the resources to carry out mandated activities and projects to produce outputs that are relevant to its stakeholders and contribute to the national development. With the aim of enhancing its performance in future, the report also includes some recommendations needed to strengthen the weak areas that were observed during the review.

The general guideline given in the “Review Manual-Procedure for the Performance of Review of S & T institutions” developed by NASTEC was used as the basis for the reviewing process and to provide opinion. The Self Evaluation Report provided by the IPHT covering the period from 2013 to 2015, other documents that were made available to the review team and observations made by the members of the team during visits were used in providing an unbiased opinion with regard to the overall functions & services rendered by the Institute.

The lack of a properly updated Corporate Plan was a major drawback observed in strategic planning and management of the Institute. In the development of the Corporate Plan, it is recommended to adopt a more formal procedure, with inputs of the Board of Directors in setting directions and strategic thinking, alongside with discussion and feedbacks of the stakeholders.

To enhance outputs, it is essential to adopt a better research planning process, where prioritization and planning of research programs should be improved to address national development goals and issues related to post harvest technology.

Another important issue at IPHT, which affects the performance and development of the Institute considerably, is related to the R & D staff. Therefore, more emphasis should be placed to strategically address R & D staff issues; attracting, recruiting, training & retaining. Although some of the staff is very experienced, lack of senior colleagues for guidance, closed cadre system, comparative low remuneration and the physical setting of the Institute all combined together adversely affect recruitment and retention of staff. This situation was evident from the shortage of the R & D staff in the Institute during the period of review.

As the Gazette 2000 addresses the primary objectives of the Institute for improving the post harvest technology in the country with the support of the Government and other

funding bodies, the review team highly recommends following the same objectives. Further, it was evident that only the views and the needs of the limited number of stakeholders had been considered while some important projects of national interest have not been given adequate priority and emphasis.

The revival of a program to initiate projects that could provide small machinery to sustain SME in agriculture based industries in the country is needed for achieving goals of national development. Further, for inclusion of modern technology in the field of post-harvest research, the establishment of a consultative committee comprising of outside experts would be a good option.

Collaborations by sharing expertise and facilities with other relevant national and international research institutes is indispensable to obtain significant outcomes and for an enhanced progress in the area of post harvest technology.

There is a strong need to review the recruitment plans to recruit R & D staff having competencies in novel disciplines and emerging technologies, in order to realize the goals and some mandated objectives of the Institute which have not been accomplished yet.

The current administrative procedures of the institute cannot accommodate and support handling of procurements, managing transport and maintenance etc. as all these activities are carried out by one division. Thus, it is imperative to have a proper division of labor in connection to the above mentioned activities, to support R &D projects without unnecessary delays and impediments that are encountered at present.

Building up of partnerships with the private sector is another notable modification that can be introduced to overcome existing major issues in the area of post harvest technology.

Further, having the cutting edge technology in the Chemical Laboratory and required manpower, the Institute should strive establishing an accredited laboratory, which will be a very good source of income to the Institute.

The review team is of the view that the long standing experience of the staff in dealing with problem solving research and consultation, especially in the area of rice processing is strength available at IPHT, for providing a certification service for the importation of machinery for rice processing.

No clear evidence was available for regular monitoring or an evaluation procedure for reviewing of projects. Thus, the introduction of an appropriate and effective quality assurance procedure to ensure the quality of R & D outputs is proposed.

The upgrading of the Extension Offices in different districts is a vital requirement to provide quality services to a wider section of the stakeholders in the country.

A computer based IT system is an indispensable tool required to support in maintaining and updating of staff information, coordination of internal functions, etc.. Such a system would benefit the smooth functioning of the Institute and it will indirectly increase the productivity as well.

The management structure should be reinforced granting relevant authority for the posts that are at present not legally assigned, with mandated duties and responsibilities as required for the said post.

The Institute has conducted a substantial number of production/extension oriented training programs and distributed various forms of publications to create awareness and to enhancing the knowledge of stakeholders. An appropriate feedback mechanism integrate to programs should be established to reveal the effectiveness of all these activities.

INTRODUCTION

The Institute of Post Harvest Technology was established in 2000, by an extra ordinary Gazette of the Democratic Socialist Republic of Sri Lanka, No. 1137/10, under the provision of the State Agriculture Corporation Act No.11 of 1972. This Institute has taken over the function of the Rice Processing Research and Development Centre (RPRDC) of the Paddy Marketing Board, which was set up with FAO/UNDP assistance in 1976. The Institute of Post Harvest Technology operated under the Ministry of Agriculture Development and Agrarian Services, functions as the main Institution in Sri Lanka engaged in improving the Post Harvest Technology of rice/other grains, field crops, fruits and vegetables, spices through Research, Training & Extension, Consultancy, Advisory and other development activities. It is located in the Anuradhapura District of the North Central Province of Sri Lanka. This location could be considered as an ideal place to carry out development activities related to agriculture especially cereals and pulses, as most of the other agricultural products originate from this province or from surrounding provinces.

1.1. The Main Objectives of the Institute

As per the gazette notification, the purpose of establishing IPHT is wide and varied and it has clearly identified the objectives as follows:

1. To conduct surveys in order to ascertain the present level of development of post harvest technology on perishable and non perishable food crops in Sri Lanka and to make an in depth analysis of the research development work done up to the present time.
2. To identify research needs for the development of the post harvest technology in Sri Lanka and determine post harvest research and development priorities in respect of rice, other grains, field crops, fruits , vegetables, cut flowers and ornamental plants and spice crops up to year 2005.
3. To formulate plans for future development of post harvest technology of food crops with special emphasis on the following aspects:-
 - a) The development of improved techniques for processing and storage of agricultural produce. The introduction of post harvest technology that would lead to value addition, better packaging and efficient transportation which minimize losses and thereby increase the income to farmers.
 - b) The development of new and efficient small agricultural equipment locally that would improve the quality of production and be competitive both locally and internationally.
 - c) The effective technology transfer and dissemination of information of improved technologies in the post harvest sector, to farmers, farm organizations and other relevant target groups including value of marketing quality produce and the use of new technologies in post harvest and value addition to improve the marketability of commodities.
 - d) The development of rural agro-based industries, which should include primarily as well as secondary processing to produce various food products in order to create a higher market demand for food crops produced locally.
4. Undertake collaborate research and development programs on post harvest technology with recognized International and Regional and National Institutions and benefit from the knowledge available in this field.
5. To work closely with the Food Research Unit and the Rice Research and Development Institute of the Department of Agriculture, the processing Centre of the Development of

Export Agriculture, Faculties of Agriculture of the National and International Universities and the Post Graduate Institute of Agriculture of the University of Peradeniya, and undertake research and Development programs to address the issue of post harvest losses and to increase value addition to food and beverage commodities.

6. To undertake problem solving research assignments on a fee-levying basis to find solutions to problems in technology faced by existing industries in the adoption of technology.
7. To initiate programs to conduct training courses on post harvest technology and award certificates and to grant Research Fellowships to premier scientists and research students of Universities, Public Research Institutes to work at the Post Harvest Institute of Technology for the development of new technologies relevant to industry.
8. To serve as the coordinating body to bring together all agencies concerned with research and development on post harvest technology, to review progress and settle inter agency differences towards achievement of planned objectives;
9. To produce both public and private sector, services of competent professionals who will help to develop advanced technologies in post harvest and value addition.
10. To assist in removing the constrains faced by the existing government, non-government and private agencies and to support them in the implementation of the plans on post harvest development.

Although the above objectives are mentioned in the Gazette, in the document which was incomplete provided to the review team as the Corporate Plan, some of the above important objectives had been omitted.

1.2. The organizational Structure and Human Resources

The Institute is governed by a Board of Directors appointed by the Minister holding the portfolio of Agriculture. The function of IPHT are administered by the Chairman along with members of the Board of Director appointed by the Minister. Director/CEO is the Head of the Institution. Under the Director there are two Additional Directors, (Research and Technology Transfer and Administration and Finance).

IPHT consists of the following seven main divisions, Production/Mechanical and Process Engineering Research Division, Post-Harvest Handling-Perishable Division, Post-Harvest Handling-Durable Division, Product Development Division, Technology Transfer Division, Administration and Finance Division and the Internal Audit Division.

2. The REVIEW PROCEDURE

2.1 The Panel and the Methodology

The Science and Development Act No. 11 of 1994 mandate the National Science and Technology Commission (NASTEC) to review the progress Science and Technology Institutions in relation to objectives set out in Section 2 of the Act. In consultation with the institute to be reviewed, NASTEC decides on the review team as well as the schedule for the review.

NASTEC in consultation with IPHT entrusted the review task to a team of four members having the relevant expertise. The team comprised of following members,

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NASTEC met the review team on 1st March 2017 and provided the guidelines and the documents including Self Assessment Report of IPHT required in conducting the review. The first site visit was carried out on the 29th and 30th of March 2017. The initial meeting was held with the CEO and the senior staff of the Institute on the 29th March to brief them about objectives of the review and to explain as to why this evaluation is being carried out and the benefits of the evaluation to the institution. Subsequently, the CEO of the institution made a presentation based on the self evaluation report submitted for evaluation.

During the visits the review team held discussions with the Director and members of different categories of staff of all the divisions. A second visit was made on the 4th of May, which was mainly to meet the stakeholders who obtain the services of the institution and the Chairman. On the first visit, the review team visited all the relevant laboratories, workshops, the pilot plants and other demonstrational technologies established in the premises of the institution and also had discussions with staff of respective Divisions.

2.2. The Assessment

The review team examined the following documents provided.

- Self evaluation report
- State Agriculture Corporation Act, No.11 of 1972
- Publications of the Institution
- Research papers

- Guidelines for research project identification, implementation and introduction to the field
- Corporate Plan (Incomplete document)
- Annual reports

2.3. The Report

The members of the team prepared different sections of the report based on the findings, which were collated and subsequently finalized following a series of meetings and communication through e-mails. The final document was prepared with the consensus of all the team members.

3. MANAGEMENT ASSESSMENT

3.1. Institutional Response to external and internal environment in planning strategy

The main objective of an institute or an organization is to deliver its mandated services to the external environment allocating the resources of the internal environment. Thus, the Corporate Plan or Strategic Plan of an Institute reflects its organizational strategy to meet the needs of the external environment by the adoption of policies of the Government, addressing Stakeholders demands and responding to prevailing national issues with optimum utilization of the resources available in the internal environment. Internal environment of an organization includes the CEO/Director, the Board of Directors and the Institutional staff at all levels.

IPHT is understood to have a Corporate Plan in formulating strategic future activities, which provides guidance for R & D activities to be carried out annually as mandated. The review team was provided with an incomplete Corporate Plan and also it was evident that a formal procedure had not been followed in the preparation of the document. Therefore, the review team proposes to expedite the preparation of a Corporate Plan to secure the future direction of the Institute and advice and for S & T staff to follow the strategic actions in selecting of proper R& D projects for the annual Action Plan.

The objectives of this Institute, as stated in the Gazette of the Democratic Socialist Republic of Sri Lanka No. 1137/10 – Monday June 19, 2000, is to mandate twelve major actions as mentioned in the introduction of this report. The review team noticed that the IPHT had responded moderately to external & internal environment in planning organizational strategy. This was evident in the comprehensive SWOT analysis of the existing document submitted as the Corporate Plan, where less attention had been paid to human resources and infrastructure development and also to the views and comments of the stakeholders.

It was evident that the updating exercise of the Corporate Plan had not been identified as a priority need and had become a non-formal routine exercise without much stakeholder

discussions and inputs. The review team also noted that in decision making, the senior staff is involved while the involvement and input from the supporting staff is inadequate. Further, a greater degree of involvement of the Board of Directors in setting directions in the preparation and in carrying out the activities stated in the Corporate Plan would have been more effective.

In general, the Government/Ministerial policy directions are taken into account when preparing the Corporate Plan, mainly with the awareness and feedback from the Chairman along with the Members of the Board and the Director who attends Ministry meetings regularly.

The government at present is more focused on value added agricultural and food products to be developed, aiming to gain foreign exchange through the export market. However, the review team recognized that the institutional contribution was not fully aligned with the government policies in this regard as the focus rests mostly on the local market with little concern on the export market. Therefore, the review team recommends to be more responsive to government policies by selecting projects with high positive impact on the economy of the country.

Highly qualified S & T staff, fully equipped laboratories and workshops have been recognized as strengths of the Institute in the SER. But the data provided in SER show that during the period of the review (2013 to 2015) the number of Research Staff has not been increased according to the cadre requirement. Existing Research Staff is about 40 % of the total approved cadre, which is a major issue that significantly affects the institutional mandated outcome. The physical setting of the Institute, low remuneration level of the new recruits and lack of promotional schemes are undoubtedly the main causes for this drive back. In this backdrop, the review team emphasizes, the need for immediate solutions to the issues stated. Attractive remunerations on par with other research institutes and appropriate incentives are feasible approaches to draw the required Research Staff to the Institute.

At the stakeholder discussion, it was evident that a reasonable response had been shown towards the stakeholders' views and needs, but the Institute at large had not been successful in getting adequate confidence and the required attraction of the stakeholders. The total number of representatives at the stakeholder meeting was noted as 28, but the actual number of stakeholders represented was only 18 following exclusion of Official staff (Vidatha Officers, Grama Niladhri personnel, University staff member and the UN representative). Further, the review team could not find adequate evidence to consider that views and needs of the stakeholders are fully reflected at the planning stage. In addition, the stakeholder representations were confined mostly to areas such as fruits & vegetables, rice milling & processing, while few other mandated areas had been given less emphasis. If stakeholder participation was adequate, more demand oriented activities with private sector collaboration and a service orientation would be evident.

3.2. Planning S & T Programs and Setting Priorities

Generally a program represents a set of research and development projects, which are oriented towards the attainment of broader objectives of an institute. At IPHT, it was not clearly evident that national development goals were considered in planning programs and setting priorities. Reduction of post harvest losses of perishable and non perishable foods and conducting training to famers and SMEs on post harvest technologies were the main project areas identified at IPHT. It was apparent that most of the projects had been selected based on the discussions and representation of a limited number of stakeholders. Further, as IPHT earlier functioned as the RPRDC, still most of the current projects are linked with rice processing. Consequently, certain important postharvest projects of national needs have not been given adequate priority. One way of rectifying this situation, where priority settings are unbalanced would be to pump fresh blood through new recruits having innovative ideas and competent in handling projects in different areas of post harvest technology.

Further, it was not evident that a program was available to develop small equipment or tools needed for threshing, slicing, cutting, drying, milling, de-stoning, crushing etc. that were necessary in post harvest activities. The review team noted that only a handful of projects under this program had been conducted during the period of the review towards achieving goals of national development at IPHT. Thus, it is recommended to revive this program to initiate projects that could provide small machinery to sustain SME in agriculture based industries in the country.

3.3. Planning S &T / R & D Projects

IPHT presently has qualified scientists in several relevant fields. Further, the Governing body is comprised of Sri Lanka's leading scientists who could provide proper guidance and counselling required in upgrading the post harvest technology in the country. However, in order to include modern technology pertaining to post harvest research, IPHT should establish a consultative committee for research, to get the support of outside experts in project planning.

The Science and Technology and Research and Development projects in IPHT are identified by the research officers, partially taking into consideration the national development goals and the stakeholders' needs. The project proposals thus developed are presented to the Research Planning Committee, which consists of ten professionals attached to state organizations and universities. The Committee, which meets twice a year, evaluates the proposals submitted and gives necessary comments and suggestions. After addressing the comments made by the Committee, the proposals are submitted to CARP for funding.

Due to the incompleteness of the Corporate Plan, there is no proper guidance in planning projects as per the well-defined objectives stated in the Gazette of 2000, reflecting the needs of the country with respect to the field of postharvest technology. In this regard, the review team highly recommends following the original objectives in the Gazette 2000, as

it addresses all the possible means to improve the post harvest technology with the support of the Government.

Post harvest technology involves a multidisciplinary approach; therefore it is indispensable to carry out research in collaboration with other institutes. The review team noted that the few collaborative research projects currently in operation are confined to Postgraduate Institute of Agriculture of the University of Peradeniya. Therefore, the review team recommends improving research collaborations with other relevant national and international research institutes for a better progress and to obtain tangible outcomes in the area of post harvest technology by sharing expertise and facilities.

The Review team could not find any documentary evidence showing that long-term partnership with private sector had been established for conducting projects during the period of review. However, it was observed that few consultations and short term projects with private sector had been carried out during the period. The review team is of the opinion that private sector involvement should be improved through applied research, especially to find solutions to existing major issues in the area of post-harvest technology.

IPHT is one of the institutes that has the mandate for developing post harvest machinery for small industries. With the currently available facilities, it should focus more on machinery development for small and medium scale processing based industries. For this purpose skilled workers are needed and the review team recommends providing local and foreign training to the technical staff of the IPHT through its budgetary allocations.

There is hardly any evidence indicating that environmental issues are addressed during planning of projects. However, a couple of projects had been carried out to solve environmental issues in the rice processing industry. It is recommended to pay more attention to environmental issues at the time of planning of projects.

Development of technologies for the food sector by the IPHT since its establishment should be appreciated with the facilities available. However, the review team noted that the required testing services for food products were not available at IPHT. Having a well-equipped laboratory, IPHT should initiate proper testing services to provide quality certificates to the stakeholders and thereby generate a good income to the Institute.

Recently the cut flowers and foliage plants industry has been gaining momentum in earning a good deal of foreign exchange to the country. But only limited amount of work has been done at IPHT in the area of floriculture. Therefore, the review team is of the opinion that floriculture post-harvest technology needs swift attention of the IPHT. It is therefore suggested to recruit suitably trained staff or to train the existing staff either locally or abroad in floriculture post harvest technology.

At the stakeholders meeting, it was evident that the existing small and medium scale industries were faced with problems in the adoption of technology to the local setting when machinery is imported. In this regard, IPHT has been in the forefront in providing the required consultation to the stakeholders without levying a fee. However, the review team is of the view that the problem solving research or consultation should be done on a fee levying basis to generate a good income to the institute and at the same time providing incentives to the staff.

On the same lines, the certification services for machinery imported or locally manufactured could be one of the services that IPHT could provide for income generation. Most of the processing industry people face difficulties in selecting appropriate machinery for their industry and most of machinery in the market are substandard. Therefore, a certification service would assist industries to purchase a machine worthy of the money spent and also to maintain its quality.

Research and development are always associated with education. The human resources of the IPHT should be utilized for the teaching of the subject, post harvest technology in Sri Lanka by introducing a formal education curricula leading to a Certificate or Diploma. This would be one source of the income for the Institute for its sustainability as well.

3.4. Project Management and Maintenance of Quality

Each and every research project requires its own specific equipment and consumables. IPHT is basically equipped for conducting current projects that it has undertaken. At present the research allocations received from the Treasury meets all these requirements without much hassle. Therefore, it is the responsibility of the management to select the appropriate projects that fulfill the present needs of the country.

However, to progress through research and development activities, training of technical staff is an indispensable requirement. With the emerging technologies, specially related to materials, electronics, production technologies and instrumentation, IPHT should look into providing necessary training to S & T staff so that these new technologies can be used in the field of post harvest activities in future. Further, there are instances where training cannot satisfy the requirement, as there is a dearth of people with the background knowledge for the specialty required by the institute for present research and developments. IPHT presently faces this situation for some specific fields and should consider recruiting individuals with expected expertise and the people with interest in the newly developed specific fields. Some examples of emerging fields that are presently developing rapidly include Embedded systems, Electronics and Instrumentation, 3D printing, Materials, Molding and Forging technologies. These fields are used in developing technologies for almost all the fields.

It was also noted that, the prevailing administrative procedures of the Institute are not effective and supportive for the implementation and conducting of projects. No proper divisions have been established in handling procurements, managing transport and managing of maintenance etc., to support R &D projects.

To ensure proper project management and quality of research, it is essential to monitor the progress of projects regularly. However, the review team could not find any indication in the SER or any information on regular monitoring or evaluation procedure for reviewing of projects. Thus, it is recommended to abide by an appropriate quality assurance procedure to ensure the quality of R & D outputs of the institute.

Further, the review team noted that the library at IPHT is not properly functioning as the post of librarian is still vacant. Therefore, related functions of the library such as, access to scientific journals, relevant international databases, and scientific publications are not within the reach of the researchers to support projects. Therefore, the committee recommends immediate recruitment of a librarian and a library equipped with modern IT facilities to support the activities of R & D staff.

The evaluation team is of the view that the IPHT should focus on utilizing the existing resources to the maximum and the developing the facilities and resources to complement with the economic situation of the country. Machine shop, Sheet metal shop, and carpentry shop needs improvements. Further there should be a set of new processing machinery for grains and perishables for research and demonstration purposes.

As per the mandate, the Institute mostly handles applied research and development activities. When it comes to fundamental research, it is recommended to do more collaborative research and development activities with universities and other higher education institutes.

3.5. Human Resources Management

Qualified staff and their performances constitute the backbone of any institute or organization. Basically the staff at IPHT is comprised of three main categories, R & D Staff, Accounting and Administration.

As indicated in the SER, Research Staff is understaffed by 60%. There is one cadre position for a librarian, which is vacant at present. In the Administration category, there are four cadre positions for executives but only 3 positions have been filled. Consequently, inadequate staff both in R & D and Administration is a key impediment factor for new technology generation and dissemination and for the prime functions of IPHT.

Further, the recruitment plans should be based on the goals and the mandate of the Institute. Existing R & D staff basically comprises of engineering and agriculture disciplines, while there are only few science graduates. Thus it was noted that there has been an imbalance in some disciplines according to the mandated activities of the institute. Therefore, the review team strongly recommends recruiting S & T personnel based on the mandated disciplines of the Institute. For example, if the institute has plans to establish Laboratory Accreditation Scheme in future, it is imperative to get the services of Science graduates in laboratory work.

A closed carder system was identified in several categories at IPHT, therefore the senior members get stagnated for long period of time, consequently causing a negative effect on their performance. In this backdrop, the review team proposes to establish an open cadre system and a performance based promotion scheme as well, to improve the performances of the S & T staff.

Another important drawback observed at IPHT is the lack of senior scientists who have diverse expertise in the Institute to handle a variety of projects. This situation could be

improved by creating new positions to attract the senior scientists/consultants from other institutes on both long term and short term basis.

Training of the staff aligned with the objectives of the institute is another important aspect in the development activities of an institute. It is essential for the Institute to identify training needs for new and emerging technologies for the S & T staff. Three types of training programs are proposed, Internal training, External training (local), External training (foreign). The internal training programs can be organized for new recruits or junior staff within the Institute. Since the Institute has hostel facilities these types of programs can be conducted as residential programs with the assistance of internal or external experts in the relevant field. The other two types of external programs can be organized annually for S &T personnel. Therefore, it is proposed to allocate a reasonable portion of funds from the annual budget of the institute for this activity.

The review team was made to understand that the activities at nine extension offices in different districts are carried with very limited staff. The staff at Anuradhapura office provides assistance to conduct various activities at those centers as the Extension Officers at the nine Field Stations lack the required knowledge. Therefore, the review team is proposing to reorganize the management structure of the Institute and to recruit an adequate number of qualified personnel to each of the field stations.

In addition, the recognition and appreciation of services rendered by the staff would make them motivated and inspired. Therefore, the introduction of an annual effective evaluation system to assess the performances of the staff would benefit both the Institute as well as the employees. It is proposed to develop an appropriate incentive scheme to ensure that every member is benefited proportionately according to his/her contribution towards the progress of the institute.

The introduction of general welfare facilities may also be helpful in maintaining the good working environment in the institute. .

An IT based separate division should be established for the information of both the Institute and as well as for the members of the staff. Therefore it is recommended to establish a computer based IT system, which would support in maintaining and updating of staff information.

3.6 Management of Organizational Assets

The assets of an organization could be identified as one measure of its strength. Utilization of assets in a useful & systematic manner is a prime duty of the management of an organization.

The IPHT seems to be moderately resourceful in terms of infrastructure, vehicles and equipment. The Institute has fairly equipped physical, chemical, food processing laboratories, while the microbiology laboratory is found to be lacking in some of the basic equipment. The chemical laboratory is very well equipped with cutting edge technology having equipment such as HPLC, GLC and Atomic Absorption Spectroscopy, which have

been purchased quite recently. This newly established laboratory is having equipment worth of Rs. 75 million, which could be orientated for laboratory services and chemical analyses. However it is found to be the least productive Service Division in IPHT.

At a time when testing services are becoming indispensable in national and international trade, the laboratories at IPHT could be utilized to deliver the required services to the industries in the area. Thus, the IPHT having the basic facilities and manpower should strive to establish an accredited laboratory in the immediate future, thereby providing services to export orientated industries while creating a source of income by delivering the services with reliability and quality standards.

The capacities of the available and expected services have not been properly planned and thus the stakeholders are unaware about the services available. A special marketing arm should be established and implemented to publicize all the services obtainable at the Institute.

In addition, the Institute has Primary and Secondary processing units (Rice mill, Grain flour processing unit, Bakery facilities, Oil processing, Spice processing and Food processing units). The review team observed that some of these processing units and equipment that were damaged or destroyed due to floods sometime back have not been repaired or replaced yet. Accordingly, some valuable assets in this institute have been out of use for years (e.g.: Rice processing plant). The review team recommends restoring these units to be used them for demonstration purposes. Paddy and other grain storage facilities, which were earlier set up when the Institute was functioning as the RPRDC, are still present although not in use.

The Engineering workshop, utilized to fabricate small machinery, and the cold room for research purposes, are some exclusive facilities available at IPHT. The team could not observe any work in progress in relation to research or commercial activity in these workshops. This indicates that IPHT has abandoned fabricating of new technological outputs like small machines and equipment for various post harvest technological applications.

Thus IPHT as an Institute has not been successful in making use of its assets to the maximum capacity and therefore neither the organization nor the stakeholders are getting the expected benefits. Therefore, it is recommended that machineries, rice processing plants and other exhibits are repaired and put into full use for the development of the Institute for a better outcome.

A well-equipped auditorium with seating capacities of 120 and two lecture theaters with respectively 60 and 80 seats with AC, provide the infra structure required to hold conferences and training programs. They are very good assets to the institute, which could be utilized for various income generating activities. Even, the hostel situated in the same premises with 10 AC rooms and 20 Non-AC rooms and two dining halls could accommodate consultants or stakeholders who need overnight stay when they come for training or similar activity to the Institute.

The Institute also has nine Field Centers in different districts that provide services via an extension network established with the Research and Development Centre in Anuradhapura. The team was made to understand that these Field centers were not properly equipped to carry out the mandated activities. Therefore, it is proposed to upgrade the existing Field Centers with required facilities for their proper and smooth functioning.

There is also a need for improvement in the physical outlook of the Institute, both internally and externally, which may contribute to attract more stakeholders. More care and attention should be given in the maintaining of the land and building premises to be more attractive to both employees and visitors. This could be done either by having a regular cleaning and maintenance team or else the service should be outsourced.

Thus, over all there is a strong need for redesigning and the execution of all-encompassing strategies that would maximize utilization of all the available resources and would to bring forth tangible benefits to the economy of the nation in the short-medium-long run.

3.7. Coordinating and Integrating the Internal Functions/Units/Activities

Coordination of internal functions of any institute are usually achieved by regular statutory meetings such as Board of Management meetings, Management Committee meetings, Divisional meetings, ad-hoc meetings and discussions at different levels. However, the review team could not observe any indication of such regular meetings documented in SER or could not find minutes of such meetings conducted during the period. Therefore, the functions at different levels and procedures adopted by the Institute for coordination and integration of internal activities were not very clear to the review team. Thus the review team proposes to conduct regular top management meetings to which representatives from other categories are also invited. Such meeting would provide firsthand information to the policy makers who can make effective actions to minimize the issues and problems of the Institute.

Further, it is proposed to set a strategic mission aligned with the mission and vision of the Institute in every Division to obtain a maximum output. Each and every member of the Institute should be aware of their responsibilities as well as the identified goals towards the development of the Institute. As the most recent Corporate Plan was not available, the review team was skeptical about planning and coordination among Divisions, logistics and resources at IPHT. The review team proposes to conduct a few awareness sessions annually with the participation of all workers to build on new ideas based on the goals of the Institute. Based on these findings, the Institute can develop their Corporate Plan according to the mission and vision of the Institute. It is also important to organize regular meetings with the stakeholders of the Institute to get their observations, comments and confidence on the activities of the Institute.

It was evident that the poor management structure is one of the main impediments to the progress of the Institute. At present, both Administration and Finances are under one Division. It was revealed that the Administration Officer was carrying out procurement activities too and this would create serious administrative problems. Therefore, the review

team recommends establishing a separate supplies division in order to carry out the activities of the institute more efficiently and smoothly.

Another issue identified in the management structure was assignment of Heads of Divisions, which do not have legally assigned mandated duties and responsibilities as required for the said post. Therefore, the management structure should be reinforced granting relevant authority for the posts.

Further, the review committee unable to find multidisciplinary research groups functioning at IPHT. Using the expertise of the current Research Officers and co-opting experienced researchers from other institutes, research groups could be identified and formulated to conduct research based on the present-day needs of the country as per the mandate of the institute.

The review team noted that a proper MIS is lacking at IPHT. Therefore it is recommended to establish an IT based separate division in order to carry out various activities in an orderly manner. A computer based IT system, which would support in maintaining and updating staff information. A proper MIS in the institute would assist in planning and coordination of various activities of different divisions /units, which in turn would increase the overall output and also would assist in the smooth functioning of the institute.

3.8 Managing Information, Dissemination and Partnership

Technology dissemination is one of the major activities of the Institute. The annual reports of IPHT include the activities it has undertaken to disseminate information to producers, processors, traders and extension workers, from both public and private sector agencies, in the field of postharvest technology of grains, fruits and vegetables.

The institute conducts production/extension oriented training programs to create awareness and to enhance the knowledge of stakeholders. These training programs are conducted for various groups of stakeholders at Anuradhapura as well as at the Field Centers located in different districts.

During the period of review, the Institute has produced a large number of information leaflets, booklets etc. to provide technological know-how to stakeholders and the general public. However, these materials are mostly in Sinhala language and a few in Tamil and English. Therefore, it is important that all the publications are translated to Tamil language in order to share scientific know-how with the members of non-Sinhala communities as well.

The Web page of the Institute should include more information with regard to already developed technologies, which could be adopted by stakeholders and general public interested in the subject. Sinhala and Tamil versions of the web pages should also be developed to provide information pertaining to post harvest technology for all Sri Lankans without facing a language barrier. However, the review team was pleased to note that technology dissemination programs had been carried out in the North and East of Sri Lanka in collaboration with WFP and ILO.

Further, the institute requires a proper system to market the technology to small and medium scale entrepreneurs. To increase public awareness, the review team suggests developing more programs to enhance publicity and advertise the capability of services and facilities available at the Institute. The establishment of a sales outlet and also a bill board highlighting the main tasks of the Institute at the entrance would be a way of getting a better attention of the public.

As per the records provided, the review team is pleased with the information dissemination procedure carried out by the Institute. However, due to the lack of any indicators it was not possible to verify the effectiveness of the information dissemination process. The review team therefore suggests developing indicators to substantiate the usefulness of the information dissemination process.

The Institute had held an International Post Harvest Research Symposium in 2014 under the theme “Safe Food for Healthy Life” where 30 research papers had been presented in four different technical sessions. In parallel with the symposium, an exhibition on “Post Harvest Machinery and Innovations” had been held for the general public to disseminate the activities of the Institute. Further, the “World Food Day” celebration had been held at IPHT in 2015, with the collaboration of the UN Food and Agriculture Organization and the Ministry of Agriculture. While appreciating the efforts made towards holding an International Symposium, exhibition etc. the review team recommends conducting such events annually in major crop producing areas of the Island.

By participating in various exhibitions such as Agricultural exhibitions, “Divinaguma” “Deyata Kirula” “Profood Propack “ඵසවිසසනී තොර ආහාර” etc. IPHT has given a great deal of publicity to its activities.

3.9. Monitoring, Evaluation and Reporting

According to the SER, the Research Planning Committee, which consists of ten professional members from state organizations and universities initially, evaluates the projects submitted by researchers. Subsequently, the revised proposals are prepared according to the guidelines of funding bodies and submitted to the respective funding organizations. Research proposals may be submitted individually or as a team.

However, there was no evidence of any internal progress reviews or evaluation of the research, products or technologies developed. Therefore, the review team strongly recommends developing a procedure to monitor the progress of projects against clear performance indicators laid down in the research proposal annually, by a team of experts from the relevant disciplines from state organization and universities along with internal senior scientists of the Institute.

Further, it proposed that any post harvest technologies developed by the Institute should be published through mass media in order to deliver the message to the relevant stakeholders.

4. Output Assessment

Self evaluation report, Annual reports and other documents indicated that all the Divisions of IPHT are carrying out research & development work in the area of post harvest technology, that have relevance to both organizational mandate and national needs.

The SER provided us with the details of the projects under taken from 2013 to 2015 by all the divisions of IPHT, which included the objectives, relevance of projects, budget and outputs (number of publications, Patents etc.). The total number of projects completed during the period was 43 out of which 13 projects were those commenced in 2012. The majority of these projects have been funded by the Treasury. Five of them were privately funded projects having relevance to both organizational mandate and national needs.

Out of the total of 43 projects completed during the period under review, 75 % of them had been concluded with publications and four of them had applied for patents. Sixteen per cent of the projects had ended with a fabrication of machinery. However, there was no indication of any commercialization of these machinery as these had been fabricated for the privately funded projects. The review team could not find any evidence to show that the Institute had earned substantial royalties through these projects.

4.1. Technologies Developed

Expected outputs related to new product/ technologies are inadequate when compared to inputs and hence the productivity too is very low during the period 2013 -2015 as per the given data. Accordingly only two new technologies have been developed as mentioned below.

1. Novel technology for ginger based food products. Ginger powder , Ready to serve drink.
2. Novel technology for cassava flour. Cassava flour based products.

These two processing technologies are related to food technology but no technology /product related to other mandatory thrust areas have been developed or innovated.

4.2. Technologies Transferred to Industry/Entrepreneurs

The review team cannot be satisfied with the number of technologies that were developed locally and transferred during 2015, as the outputs over the inputs of resources are inadequate. Only the two following technologies have been transferred.

1. Proper mechanism to extract edible oils such as mee, neem and gingerly.
2. Dehydration of fruit & vegetables according to foreign technologies have been adapted and transferred.

4.3. Information Dissemination/Extension

A variety of publications which can be categorized as Technical report, Consultancy reports, Information leaflets and Newsletters are available at the institute. Through the numbers of information leaflets produced (>60,000) and the numbers of extension carried out (1271 residential programs and 273 one day programs) it is evident that the Institute is very active in this area.

According to the SER 36 consultancy reports had been prepared during the period of the review (2013, 2014, 2015 years, 10, 12, 14 respectively). However based on the responses given for the questionnaire survey conducted by NASTEC it was indicated that 25 consultancies had been carried out in 2015, for which the institute had received a sum of Rs 25,91750.00. These figures indicate that the income received through workshops and private funded projects is grossly inadequate when compared to the inputs. Thus, the review team strongly recommends developing an appropriate system to earn a substantial income from consultancies and royalty payments from privately funded projects.

4.4. Research Publications

According to the information provided, IPHT has produced 4 SCI Journal publications, 11 papers in refereed journals and 30 abstracts presented at conferences during the period of the review. In terms of reviewed publications, the Institute has performed moderately. Developing an incentive scheme would be a way to promote publications.

4.5 Patents

In 2015, IPHT had received three patents. Two of these were for machineries fabricated at the Institute, a steam sterilizer for dried pepper and a continuous steamer for paddy. The third patent was for the development of wax coating for extending shelf-life of Guava fruits. Further, a presidential award has been received for the steam sterilizer for dried pepper while merit awards has been received for the other two inventions.

These awards and patents received give an impetus to the rest of the staff, especially to young staff to conduct more innovative research. Further, these are strengths for the IPHT and also could be used as one of the valid performance indicator in future planning and evaluation.

4.6. Services (Testing, Calibrations, Advisory and etc.)

As per SER, IPHT has carried out advisory services to stakeholders and general public during this period through publications in the form of information leaflets and booklets on product development, methods pertaining to reduction of post harvest losses of grains, fruits and vegetables, processing of rice and value addition to various foods. Consultancy reports (Nos. 36) and Technical reports (Nos.55) provided to stakeholders are also major outputs of the institute during this period.

Workshops and training sessions done at nine field stations could also be considered as advisory services provided by the institute. SER indicated that 1544 people had been trained during this period in various aspects of post harvest technology but a mechanism had not been developed to get a feedback from the trainees to find the effectiveness of the training, which could be used as an indicator in future.

Based on the SER the review team did not observe any evidence with regard to testing and calibration services done at the Institute. Having a state-of-the-art chemical laboratory, the institute should aspire to develop an accredited laboratory to provide testing services to the stakeholder in the region.

4.7. Trainings

Post harvest technology is an area where lots of novel technologies are being introduced and practiced. However, it was evident from the SER that the training provided to S & T and R& D staff during this period was grossly inadequate. Only two persons had participated in an International workshop/Training on Post harvest technology during this period. Therefore, R & D staff at the IPHT should be given more opportunities to update their knowledge and skills in emerging technologies available internationally. Further, the lack of training to S & T staff could affect their career development, which may be one of the reasons for non-retention of staff.

5. Productivity

5.1 Total S & T staff strength of institution

The scientific staff includes the Research Staff, Supporting Staff and Librarian/ Information Officer. The total cadre positions of the Research Staff are 38 but only 15 positions have been filled. Similarly, there are 31 cadre positions in the Supporting Staff category but only 18 positions had been filled up to 2015. There is one cadre position for a librarian, which is vacant at present.

On the basis of expertise of Research Staff, out of the total of 15 members, the majority of them (8) are having an Agriculture Degree while 5 people possess an Engineering Degree. There are only two science graduates on the Research Staff. Except for two staff members all are have postgraduate qualifications. When considering the age of the Research Staff, except for two all the others are in the range of 40-50 years. The review team observed the lack of young staff, <40 in the Institute which is a major drawback for the future progress of the Institute.

5.2. Productivity of the Institution Based on Outputs and S & T Staff Strength

The IPHT has qualified and experienced S & T and supporting staff with a hierarchical organizational structure, moderate infrastructure facilities, ample space and some

laboratories' equipped with state-of-the-art equipment. The review team noted that IPHT carries out some of the selected mandated functions stipulated in the Gazette notification.

Productivity of an institution is the ratio of output/inputs. The human resources, infra structure facilities and funds provided are considered as inputs of the Institute.

The outputs of the Institute that could be used in the estimation of productivity are the key performance indicators mentioned in the SER. They are Technical reports, Consultancy reports, Extension/Advisory services, Research publications, Training programs conducted, Conferences, Workshops and other awareness programs, patents and awards received, etc.

Based on the information as per the above criteria the review team evaluated that the expected productivity should be improved significantly to achieve the mandated objectives of the Institute.

6. Recommendations

- To secure future directions in the preparation of an updated Corporate Plan, a deep SWOT analysis should be carried out considering the current situation of the Institute and the environment. Proper direction setting and strategic thinking in line with the Vision, the Mission and the mandate of the Institute are essential in this vital process. In the preparation of the Corporate Plan the views and supervision of the members of BOD are indispensable.
- As IPHT has been established under an extraordinary Gazette notification, several major drawbacks and issues in relation to current remuneration, promotion schemes and prevailing cadre system were identified. In this context, disparity in scientific staff remunerations when compared to other S & T institutes and the lack of promotion schemes as per the prevailing cadre system for all categories of staff could be the main reasons for the Institute to be less attractive. To overcome these constrains, it is recommended to implement suitable procedures linking with relevant government organizations.
- The narrow range of stakeholder participation indicates that the external environment is uninformed about the varied objectives of IPHT. Thus it is recommended to provide awareness programs to the external environment with regard to the mandatory objectives of the Institute in order to attract stakeholders having diverse issues in the field of post harvest.
- The objectives stated in the SER are limited to a few areas when compared to those in the Gazette .The review team strongly recommends to follow the original objectives in the Gazette 2000 as it addresses all the possible means to improve the post harvest technology with the support of the Government.

- The Institute has an updated document with regard to the research planning process. It is recommended to strictly follow the procedure given in this document with regard to research planning identifying programs that address national issues and goals. It is recommended to initiate a program that could provide small machinery to sustain SME in agriculture based industries in the country, which is one of its objectives as stated in the Gazette of 2000.
- Limited numbers of collaborative research that lead to post-graduate degrees exist. It is recommended to improve research collaborations with other relevant national and international research institutes to realize enhanced progress and to obtain tangible outcomes in the area of postharvest technology.
- The review team recommends improving the participation of the private sector through applied research, especially to find solutions to existing major issues in the field of post-harvest.
- Emphasis placed on staff development through international training is inadequate. In order to stay abreast with the new technologies, the S & T staff needs to be given frequent exposure to international training programs to update their knowledge and skills.
- The supportive functions are not effective enough to enhance the output performance significantly. The review team recommends to establish, new supportive divisions with relevant cadre positions for Procurement, Transport and Maintenance to ensure efficient performance of the Institute.
- As a performance appraisal procedure is not available at present, it is recommended to abide by an appropriate quality assurance procedure of continuous monitoring and evaluation within the process of project management to ensure the quality of R & D outputs. Further, upgrading the existing library facility as a source of information with a qualified librarian for the same is also recommended.
- The issue of imbalance in the R & D staff could be overcome by considering the field of specialty in relation to the needs of the Institute and the professional experience in the relevant field at the time of recruitment.
- The quality of existing Field Centers should be improved by providing qualified staff and infrastructure facilities. Further, it is recommended to expand the services to cover other relevant districts. In order to cater to stakeholders in the Northern and Eastern provinces and also for the preparation of handouts and other documents in Tamil, recruitment of qualified staff having Tamil Language proficiency is essential.
- The expansion of Field Centers, will be more effective by linking with the Higher Education/ Research institute in the area.
- The review team recommends getting the accreditation of the laboratory services and making aware of all the available facilities and the consultancy services to the general

public, in order to generate an income as well as to provide quality service. Further, a special marketing arm should be established and implemented to publicize the availability of the laboratory services once they are established.

- For the efficient and smooth functioning of the Institute it is recommended to prepare annual schedules of important meetings such as Divisional meeting, Staff meetings and RPC meetings, Management Committee meetings, etc.
- It is recommended to establish a proper net-work system to facilitate planning and the coordination of various activities of different divisions /units, which in turn would increase the overall output and also would assist in smooth functioning of the institute.
- At present there is no method of getting a feedback on the output pertaining to technology dissemination. Therefore it is recommended to establish a proper system of getting feedback to substantiate the usefulness of the information dissemination process.
- To switch to the current environment, it is strongly recommended to maintain the updated web page in all three languages describing the available services, functions and activities beneficial to the general public. In order to facilitate this activity, a dedicated person with relevant capacity should be appointed.

Appendix 1: Management Assessment

1. Assessment of Institutional Response to External and Internal Environment in Planning Organizational Strategy

Management practice	Level of Practice (Performance Indicators)			Comments / Evidence
	Strong	Moderate	Weak	
Government policies and development goals are used/ considered to establish goals and plan organizational strategy for the institution		√		Government policies are used only partially in strategic planning
The organizational mandate (as specified by the relevant Act) is considered in strategic planning		√		Organizational mandate is also not fully considered
The institution is responsive to changes in Government policies and strategies		√		Moderately responsive to changes but not timely implemented
Factors such as strengths, weaknesses, threats and opportunities are considered in strategic planning			√	The relevant factors have been identified but not included totally in the preparation of the strategic plan.
Stakeholders needs are taken into consideration in strategic planning		√		Full range of stakeholders has not been represented in considering strategic planning
The Board of Governors is involved in strategic planning		√		Provide directives in strategic planning.
The extent to which staff members are involved in strategic planning	√			Senior staff members take the full responsibility in preparing the strategic plan.
Government allocations and alternative funding opportunities (donor funding) are considered in strategic planning		√		Mainly govt. Allocations are considered
The extent to which policies and plans of the organization are reviewed and updated			√	No proper mechanism has been established for reviewing & updating policies and plans

2) Planning S & T programs and setting priorities

Management practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
National development goals are considered in planning programs & setting priorities		√		It is not clearly evident that all the national development goals are considered
Board of Governors participate in planning and priority setting of program			√	They are providing directives but participation is not evident
The extent to which the staff of the institution participate in programme planning and priority setting	√			Senior staff is fully contribute towards planning of projects
Stakeholder interests are considered in programme planning		√		Full range of stakeholder's interests are not reflected
The extent to which programmes are planned and approved through appropriate procedures		√		No programs have been identified, only projects are in progress.
The extent to which the availability of funds (government allocations and other funds) generating funds are taken into consideration in planning programmes		√		Mostly govt. funds are considered in planning projects
The obtaining of necessary equipment is considered in planning programmes		√		Have considered obtaining necessary equipment but available equipment not fully utilized
Stakeholders are represented in the institution's planning and review committees.			√	No evidence of review committees
The extent to which socio economic and commercialization of aspects are considered in programme planning.		√		In project planning socio economic /commercialization aspects considered to a limited extent
Effectiveness and efficiency of institutional procedures in approving new S & T programmes.		√		Proper mechanisms identified but effectiveness & efficiency not clearly evident

3) Planning S & T / R & D Projects

Management practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The staff is provided with guidance for project planning		√		For a better output IPHT should establish a consultative committee for research to get the support of outside experts for project planning.
Previous research results/data are used for planning projects		√		No clear evidence that previous research data are considered in the evaluation process of project proposal
The extent to which the institution follows a formal process for preparation, review and approval of projects	√			Follows CARP guidelines and Research proposal guidelines of the Institute in project preparation, review & approval.
The extent to which organizational plans (e.g. medium-term plan, corporate plan, strategy etc.) are used to guide project selection and planning		√		Although IPHT has no updated Corporate Plan limited mandated activities are considered in project selection & planning

Multidisciplinary projects/ activities are encouraged by the institutions		v		IPHT should improve collaboration with the other research institutes and Universities to extend the capabilities of multidisciplinary research.
Foreign collaborations are encouraged and incorporated in planning.			v	No evidence of foreign collaborations Government intervention is important to provide facilities for scientists to visits foreign institutes and to facilitate hiring international research assistants.
Partnership with private sector is encouraged by the institution		v		At present limited partnerships with private sector exist. This should be strengthening by applying PPP grants from NSF and NRC.
The extent to which development research/activities are considered in planning projects		v		Some of the present projects are on development research.
The extent to which basic research are considered when planning projects			v	According to the mandate by the gazette less priority had been given for the basic research. An institute of this nature should focus on applied research than the basic research.

The degree to which adverse effects on environment are considered in planning projects		v		IPHT is working on environmental issues related to food processing. However there is no evidence of considering such effects at the planning stage.
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4) **Project management and maintenance of quality**

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The effectiveness of the procedures for resource allocation at different levels (organization, departments, program etc.)			v	Prevailing procedures are not effective and not accountable
Ensuring that instruments, equipment and infrastructure facilities are sufficient for implementation of projects		v		Some essential and frequently used equipment are not available.
The effectiveness of administrative procedures and support for project implementation (procurement and distribution of equipment and materials, transport arrangements, etc.)			v	No separate procurement, supply & transport divisions established
Formal monitoring and review processes are used to direct projects towards achievement of objectives			v	Documentary evidences not available with regard to a review process.
The extent to which the researchers are supported by the required technical / field staff.		v		Successful completion of projects indicate that researchers are well supported by technical & field staff
Ensuring that established field / lab methods, and appropriate protocols are used		v		Standard methods used but laboratory accreditation not implemented

Research projects/ S& T activities are completed within the planned time frame.		√		Some projects have not completed within the given time frame
Ensuring that scientists / researchers have access to adequate scientific information (scientific journals, internet, international databases, advanced research institutes, universities etc.) that strengthens the quality of research.			√	Library & IT facilities inadequate
The extent to which quality assurance practices are followed by the institutions			√	No evidence with regard to quality assurance practices
Ensuring that researchers/ scientists have access to computers and necessary software		√		Since networking facilities not available access to some software cannot be shared

5) Human Resource Management

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The institution maintains and updates staff information in a database (including bio data, disciplines, experience, publications, projects)			√	No evidence of a computer data base system as such.
The institution, plans and updates its staff recruitments based on programme and project needs			√	No evidence found in recruiting staff with regard to programmes & project requirements
The effectiveness of the selection procedures and the schemes of recruitment	√			SOR clearly indicates required qualifications & experience needed for the mandated tasks.

Training is based on institution and program objectives and on merit,			√	No guidelines found with respect to selection criteria for training.
The effectiveness of the procedures in promoting a good working environment and maintaining high staff morale.		√		Closed cadre system adversely affects the staff morale resulting less effectiveness of the working environment
The effectiveness of staff performance appraisals			√	Staff performance appraisals do not exist.
The effectiveness of rewards and incentive schemes in motivating the staff			√	Reward and incentive schemes not existing
The effectiveness of managing staff turnover, absenteeism and work interruptions.			√	Procedures not available

6) **Management of organizational assets**

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The ability of the institution to carry out its mandate and the assigned statutory powers	√			Required human resources and infrastructure facilities for the mandated tasks as described in the Gazette available with Govt. funds
Infrastructure (buildings, stations, fields, roads) is satisfactorily maintained.		√		No evidence of routing maintenance mechanism
Vehicles and equipment (lab, field, office) are properly managed and maintained.			√	No evidence of routing maintenance mechanism
The effectiveness of procedures to ensure that equipment are in working order			√	A proper equipment monitoring system was not found.

The effectiveness of the institution's overall strategy in generation and proper utilization of funds			√	No target for generating funds and no proper project management system to monitor progress over target.
The extent to which the institution identifies opportunities for income generation and cost recovery			√	No proper mechanism to identify income generating opportunities. No evidence of proper plan for cost recovery.
The extent to which the intellectual property rights of the institute are protected		√		Although patents have been applied & received but no signs of their renewal for further protection of IP rights.

7) Coordinating and integrating the internal functions/ units/activities

Management Practice	Level of Practice (Performance indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The extent to which institution is evaluated internally and restructured based on current needs			√	Internal evaluation or restructuring process was not found
The effectiveness of internal communication and coordination mechanisms			√	Internal communication & coordination was not in place
Institution's overall direction and coordination are provided by a central planning committee / unit.		√		Seems to be having informal meetings & no documentary evidence of regular committee meetings
The extent to which different units are assigned clearly defined functions		√		Clearly identified divisions are not evident for some defined functions. E. g. Admin. & Finance come under one unit.

Responsibilities of research / management staff are clearly identified	√			Responsibilities and duties clearly described in the SOR
Effectiveness of using appropriate reporting procedures and feedback in management at different levels		√		Some activities performed by a particular division related to another division are noted as unaccountable

8) Partnership in managing information dissemination

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The institution systematically plans and performs dissemination of information		√		Done mainly through training programs conducted by ROs & publications
The extent to which the institution plans and maintains linkages with key partners for sharing and dissemination of information		√		
The effectiveness of institutional procedures for technology transfer			√	Could not verify effectiveness of procedures used for technology transfer due to lack of any indicators
The effectiveness of the system to obtain feedback from different types of stakeholders			√	A procedure not found in obtaining feedback from stakeholders

9) **Monitoring, evaluation and reporting procedures**

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The institution monitors and evaluates (M&E) its own activities periodically			√	There is no evidence of a system in monitoring & evaluating the activities of the institute.
M&E is supported by an adequate management information system (MIS), which includes information on projects (e.g. costs, staff, progress, and Results).			√	MIS not developed adequately to include staff information
The extent to which S& T results and other outputs are adequately reported internally (e.g. through reports, internal program reviews, seminars).			√	Could not find evidence for regular internal reporting procedure
External stakeholders contribute to the M & E process in the institution			√	Could not find evidence that stakeholders contribute to the M & E process
The extent to which the results of M&E are used for project/ research planning and decision-making.			√	No evidence of use results of M & E in Project / research planning and decision-making

7. Output Assessment

7.1. Output measurements

Output Category	Nos.	General Comments on quality and relevance of outputs and productivity of institution
<p>1. Technologies Developed</p> <ul style="list-style-type: none"> • New products / technologies • Improved products / technologies / laboratory methods • New planting materials / seed varieties 	2	<p>Output related to new products/technologies inadequate. Hence productivity very low during the period as per the given data.</p> <p>Two new technologies have been developed. They are as follows:</p> <ol style="list-style-type: none"> 1. Novel technology for ginger based food products 2. Novel technology for cassava flour
<p>2. Technologies transferred to industry / entrepreneurs</p> <ul style="list-style-type: none"> • Technologies developed locally • Foreign technologies adapted and transferred 	2	<p>Cannot be satisfied with No. of technologies developed locally as the output over the input of resources is very poor. Only two technologies have been transferred during this period. They are</p> <ol style="list-style-type: none"> 1. Proper mechanism to extract edible oil, Mee, Neem and gingerly oil 2. Dehydration technologies for fruits & vegetables
<p>3. Information Dissemination / Extension</p> <p><i>Publications</i></p> <ul style="list-style-type: none"> ▪ S & T institutional review reports ▪ Training manuals & Advisory leaflets ▪ Maps ▪ Posters <p><i>Dissemination events</i></p> <ul style="list-style-type: none"> ▪ Workshops and seminars ▪ Conferences ▪ ▪ Exhibitions 	<p>62 different types Total 60,000</p> <p>90</p> <p>02</p> <p>20</p> <p>11</p>	<p>IPHT has produced very informative leaflets on various subjects, which are up to the standard. Translation of all these materials to Tamil Language is essential.</p> <p>Research symposium and exhibition on innovations in postharvest technology - 2014 Discussion forum on postharvest technology with NGOs and other relevant stakeholders – 2015</p>

<ul style="list-style-type: none"> ▪ Media events ▪ Open days ▪ Demonstrations 		
<p>4. Publications</p> <ul style="list-style-type: none"> • Research papers in ISI journals • Other research papers • Conference proceedings • Books and monographs • Technical reports • Research reports 	<p>04 1130 01 55</p>	<p>Quality of research papers are high but the numbers not adequate</p> <p>Includes both local and International conferences. Monograph</p>
<p>5. Patents</p> <p><i>Individual</i></p> <ul style="list-style-type: none"> • Local patents • Foreign patents <p><i>Institutional</i></p> <ul style="list-style-type: none"> • Local patents • Foreign patents 	<p>03</p>	<p>Three patents had been received during the period under review</p>

<p>6. Services (Testing, Calibrations, Consultations, Advisory and etc.)</p> <ul style="list-style-type: none"> • Policies developed • Reviews of S&T institutions • Research grants awarded and administered • Funding for training programmes and other S&T activities • Monitoring of research projects • Data bases developed • S&T surveys and maps • Science popularization activities • Environmental impact assessments • Instrument calibrations • Consultancy services • Testing and analytical services • Vaccines / seed production and distribution • Germ –plasm conservation • Recommendations in S&T matters 	<p>-</p> <p>-</p> <p>25</p>	<p>Mainly related to area of Rice processing</p>
<p>7. Trainings</p> <p><i>Staff training programmes</i></p> <ul style="list-style-type: none"> • Local • Foreign <p><i>Training programmes for stakeholders</i></p>	<p>03</p> <p>No. -896</p> <p>No. of beneficiaries -22756</p>	<p>More international training should be provided to S & T staff</p> <p>A large number of residential & one-day training programs had been conducted</p>
<p>8. Other</p>		

