

CHAPTER I PERFORMANCE AUDIT

HEALTH AND FAMILY WELFARE DEPARTMENT

1.1 Mental Health Care Facilities in Kerala

Highlights

Mental health care activities in the State of Kerala are governed by the Mental Health Act, 1987 enacted by Government of India and the State Mental Health Rules, 1990. The State Mental Health Authority established in 1993 under Section 4 of the Act is responsible for regulation, development and co-ordination of all activities in the State connected with mental health. A review of the mental health care facilities revealed absence of proper mental health planning; non-achievement of objectives of the Mental Health Policy 2000; non-utilisation of Central funds; inadequate infrastructure facilities; shortage of manpower and inadequate monitoring of mental health care facilities available in the State.

The State Government had not formulated any plan to implement the objectives envisaged in the Mental Health Policy, 2000.

(Paragraph 1.1.6)

Out of ` 9.98 crore received during 2005-06 to 2008-09 from Government of India for implementation of schemes under the National Mental Health Programme, ` 4.07 crore remained unspent as of March 2010 in treasury savings bank accounts and Nirmithi Kendra/Public Works Department.

(Paragraph 1.1.7.1)

The State Government did not conduct any epidemiological survey to identify mentally ill persons in the State as recommended by the National Human Rights Commission.

(Paragraph 1.1.8.1)

Psychiatric institutions and nursing homes were functioning without all the minimum facilities required under the Act.

(Paragraph 1.1.8.3)

Out of 12 construction works taken up in three Mental Health Centres and three Medical college hospitals using Central funds, only eight works were completed as of August 2010.

(Paragraph 1.1.8.4)

Shortage of manpower such as psychiatrists, clinical psychologists and paramedical staff in three mental health centres ranged between 64 and 94 per cent.

(Paragraph 1.1.9.1)

No inspection of the psychiatric hospitals and nursing homes was carried out by the Inspectors. Boards of visitors were not appointed for private psychiatric hospitals and nursing homes.

(Paragraph 1.1.10.2)

1.1.1 Introduction

In Kerala, 5.87 per cent (18.66 lakh) of the total population as per the 2001 census is affected with mental illnesses such as psychosis, bipolar disorder, alcohol and drug abuse, etc., compared to the all India figure of two per cent. The suicide rate (25.2 per lakh population) in Kerala is also high compared to the national average of 10 per lakh population. Moreover, Kerala is one of the leading states in consumption of alcohol. Hence mental health care assumes importance in the overall health care of the people. The mental health care activities in the State are governed by the Mental Health Act, 1987 (Act) enacted by Government of India and the State Mental Health Rules, 1990. The State Mental Health Authority (SMHA) established in 1993 under Section 4 of the Act is responsible for regulation, development and co-ordination of all the activities in the State connected with mental health. Government also formulated a Mental Health Policy in 2000. The State has three¹ Mental Health Centres (MHC) and 20² Medical College hospitals (MCH) each having a psychiatric department apart from 17 district/taluk Hospitals with psychiatric units to cater to the needs of the mentally ill patients. Besides, there are about 139 private psychiatric hospitals/nursing homes in the State providing mental health care. The District Mental Health Programme launched by Government of India as part of the National Mental Health Programme, envisages providing of sustainable basic mental health services to the community and integrating those services with other services. The Social Welfare Department of the Government is responsible for proper rehabilitation of mentally cured patients in the State.

1.1.2 Organisational set-up

The Secretary, Health and Family Welfare Department has overall control over the health care services in the State. The SMHA supervises all MHCs and other mental health service agencies in the State and also advises the State Government on all matters relating to mental health. The official members of the SMHA are the Secretary to Government, Health and Family Welfare Department, the Director of Health Services (DHS) and the Medical Superintendent, Government Mental Health Centre or the Head of the Department of Psychiatry, Government Medical College hospital. The non-official members include a medical psychiatrist, a clinical psychologist and a social worker.

Each of the Government MHCs is headed by a Superintendent. The psychiatric wards/units in the MCHs as well as District and Taluk Headquarters hospitals are under the immediate control of the Superintendents of the respective institutions. The DHS has overall control of the above institutions.

1.1.3 Audit objectives

The audit objectives were to examine and assess whether:-

- Ø there was proper planning to achieve the objectives of the Mental Health Act, 1987, the State Mental Health Rules 1990 and the State Mental Health Policy 2000;

¹ Kozhikode, Thiruvananthapuram and Thrissur.

² Five in Government Sector, two in Co-operative Sector and 13 in Private Sector.

- Ø adequate funds were provided for mental health services and were utilised economically, efficiently and effectively;
- Ø provisions of the Mental Health Act, 1987 and the State Mental Health Rules, 1990 were carried out effectively and sufficient infrastructure was available to cater to the needs of mentally ill patients;
- Ø there was adequate manpower available to provide mental health care facilities and
- Ø there existed proper monitoring of the services provided through mental health care units. .

1.1.4 Audit Criteria

The following audit criteria were adopted:

- Ø The Mental Health Act 1987
- Ø State Mental Health Rules, 1990
- Ø Mental Health Policy 2000 of the State Government.
- Ø Orders and Instructions/guidelines issued by State/Central Government
- Ø Protection of Human Rights Act, 1993

1.1.5 Audit coverage and methodology

A review of the working of Government Mental Health Centres was included as Paragraph 3.5 in the Report of the Comptroller and Auditor General of India for the year ended 31 March 1994 (Civil). After examining the paragraph in December 2001, the Committee on Public Accounts made 28 recommendations. It was seen from the Action Taken Note by Government (September 2006) that out of 28 recommendations, 19 were implemented, another four were partially implemented and the remaining five³ were not implemented.

The performance audit of the mental health care facilities in the State was conducted during April to July 2010 covering the period 2005-06 to 2009-10. Audit scrutinised records of the DHS, SMHA, all the three⁴ MHCs, Psychiatry departments of three⁵ (out of five) MCHs, psychiatry wards of two⁶ (out of eight) District Hospitals, seven⁷ Taluk Headquarters hospitals, selected on the basis of the cluster sampling method. In addition, the Institute of Mental Health and Neuro Sciences (IMHANS) at Kozhikode, two rehabilitation centres under the direct control of Social Welfare Department and eight⁸ non-Governmental institutions receiving grants from Central and State Governments were also scrutinised by Audit.

³ 1) Construction works 2) Improvement of facilities in Mental Health Centres 3) Filling up of vacant posts 4) Services of clinical psychologists to be extended to all patients admitted 5) Introduction of pension scheme for poor mentally ill patients.

⁴ Kozhikode, Thiruvananthapuram, and Thrissur

⁵ Kozhikode, Thiruvananthapuram, and Thrissur

⁶ General Hospital, Erankulam and District Hospital Kollam.

⁷ Chirayinkil, Karunagappally, Mavelikara, Muvattupuzha, Nedumangad, Neyyattinkara, and Tirur

⁸ Bodhi and Karma (under Abhaya, Thiruvananthapuram), Pratheeksha, (under Trivandrum Social Service Society), ACCEPT, Punnapra and ACCEPT, Kattanam (under Changanacherry Social Service Society), Nirmala Nikethan, Kalamassery, St. Joseph's Bhavan. Pullazhi, Thrissur and ICCONS, Thiruvananthapuram.

An entry conference was held in May 2010 with the Secretary to Government, Health and Family Welfare Department during which the audit objectives were explained. An exit conference was also held with the Secretary in October 2010 wherein both the achievements and deficiencies noticed in the course of the review were discussed and suggestions/explanations of the department were incorporated in the review. We acknowledge the co-operation extended by the departmental authorities to the audit team during the course of audit.

Audit findings

The review revealed some achievements and deficiencies/shortcomings in providing mental health care facilities in the State which are discussed in the succeeding paragraphs.

1.1.6 Planning

State Government had not formulated a mental health plan to implement the objectives of the Mental Health Policy

The State Government has to play a pivotal role in discharging its functions to ensure quality mental health facilities to the affected people in the State as envisaged under the Mental Health Act, 1987. Accordingly, State Government announced (2000) the State Mental Health Policy which envisaged development of an integrated mental health system. The long term objectives were to maximize community and clinic based resources to persons suffering from mental disorders; to provide cost-effective psychiatric treatment to them; to identify groups at risk and provide them with special support services, etc. The main short term objectives were to develop user groups and their networking; to provide mental health care services at Panchayati Raj level and to promote prevention, treatment, rehabilitation and research in the field of mental health. It also contained a provision for review of the implementation of the objectives every five years.

The State Government had not formulated any mental health plan to implement the short term and long term objectives of the Mental Health Policy including financing, quality improvement and monitoring in a phased manner. The State Government also did not conduct any review of the progress of implementation of the objectives, as declared in the mental health policy. Consequently, the State Government could not achieve the objectives declared in the policy in full as discussed in the succeeding paragraphs of this Report.

1.1.7 Financial Management

The funds required for mental health care activities were provided by the State through the State budget. In addition, Government of India (GOI), Ministry of Health and Family Welfare released grants-in-aid for strengthening of the psychiatric wings of the MCHs; for upgradation of MHCs and for activities under the District Mental Health Programme (DMHP) in five⁹ selected districts. The details were as given in **Table 1.1**.

Table 1.1 Details of funds released by State and Central Governments

(` in crore)

Year	State funds		Central funds	
	Provision	Expenditure	Received	Utilised
2005-06	13.27	11.29	7.54	7.54
2006-07	14.28	11.78	0.26	0.26

⁹ Idukki, Kannur, Thiruvananthapuram, Thrissur and Wayanad

Year	State funds		Central funds	
	Provision	Expenditure	Received	Utilised
2007-08	13.99	12.22	1.81	1.81
2008-09	17.20	16.99	0.37	0.37
2009-10	16.37	16.90	Nil	Nil
Total	75.11	69.18	9.98	9.98

Source: Accounts figures and sanctions from Government of India and utilisation certificates furnished by the institutions

1.1.7.1 Non-utilisation of Central funds

₹ 4.07 crore (out of ₹ 9.98 crore) of Central funds remained unutilised as of March 2010

Though the entire funds released by GOI were shown as utilised, audit scrutiny revealed that out of ₹ 9.98 crore released by GOI, ₹ 4.07 crore remained unutilised as of March 2010 as discussed below:-

(i) Strengthening of psychiatric wings of MCHs

During 2005-06 to 2007-08, ₹ 1.59 crore was released by GOI. Of this, ₹ 49.46 lakh was lying unutilised in treasury savings bank accounts from 2007-08 onwards and ₹ 9.27 lakh remained unutilized with the Nirmithi Kendra¹⁰ from July 2008 onwards as indicated below:-

Table 1.2: Utilisation of funds for strengthening of psychiatric wings

(₹ in lakh)

Name of Institution	Amount received	Amount utilized	Balance remaining unutilised		Reasons for non-utilisation
			in Treasury Savings Bank	with Nirmithi Kendra	
Alappuzha	30.68	5.23	16.18	9.27	Building not completed, Equipments and furniture not procured.
Kottayam	45.20	27.00	18.20	Nil	Furniture and equipments not procured.
Kozhikode	38.80	36.02	2.78	Nil	Furniture not procured.
Thrissur	44.66	32.36	12.30	Nil	Furniture and equipments not procured, Electrical work yet to be completed.
Total	159.34	100.61	49.46	9.27	

Source: GOI orders and replies furnished by MCHs

(ii) Upgradation of MHCs

In October 2005, GOI released ₹ 6.45 crore to MHC, Kozhikode, Thiruvananthapuram and Thrissur for upgradation. The Government ordered (January 2006) that the funds should be kept in a non-interest bearing Special Treasury Savings Bank account opened in the joint designation of the Superintendent and the Lay Secretary of the institution. The upgradation involved construction of wards, purchase of machinery and equipment, maintenance, etc. Out of ₹ 6.45 crore released by GOI, ₹ 5.09 crore was deposited with the Public Works Department (PWD) for construction of wards, purchase of machinery and equipments, maintenance, etc. and ₹ 1.36 crore was kept in Treasury Savings Bank account. Out of ₹ 5.09 crore deposited with PWD, ₹ 1.89 crore remained unutilised and the amount of ₹ 1.36 crore in treasury also remained idle. Details are given in **Table 1.3** below:-

¹⁰ State autonomous body engaged in construction of houses.

Table 1.3 Details of funds received for upgradation of MHCs

(` in crore)

Name of Institution	Amount received	Amount deposited and balance available with PWD			Amount kept in Treasury Savings Bank Account
		Deposited	Utilized	Balance	
MHC, Kozhikode	2.85	2.49	1.39	1.10	0.36
MHC, Thiruvananthapuram	2.50	1.75	1.05	0.70	0.75
MHC, Thrissur	1.10	0.85	0.76	0.09	0.25
Total	6.45	5.09	3.20	1.89	1.36

Source: GOI orders and replies of MHCs

(iii) District Mental Health Programme

During 2005-06 to 2008-09, ` 67.79 lakh was received from GOI for implementation of District Mental Health Programme in Thiruvananthapuram and Thrissur districts. Of this, only ` 44.37 lakh was spent and the balance of ` 23.42 lakh remained unspent in the treasury savings bank accounts since 2008-09.

1.1.8 Implementation

Mental health care facilities were to be provided in consonance with the provisions of the MHA 1987 and rules framed thereunder and also with the objectives set forth in the Mental Health Policy 2000. The implementation of various activities/programmes during the period 2005-10 is discussed below:-

1.1.8.1 Epidemiological survey

The National Human Rights Commission (NHRC) recommended (April 2009) that the State should conduct an epidemiological survey to identify mentally ill persons and draw up a strategy for setting up of new hospitals, for improving facilities for treatment, for teaching, training and research, etc. The Mental Health Policy envisaged a system to identify the mentally ill patients nature of their illness and the mental health care facilities available in the State. The State had not conducted any survey on the suggested lines and had also not developed any system to identify mentally ill patients as of October 2010. The Secretary, SMHA stated (November 2010) that action had been initiated to conduct such a survey.

1.1.8.2 Mental Health Act

The Central Government notified the State Mental Health Rules in 1990 for all the States. Sub section (2) of Section 94 of the Act provides that the State Government with the approval of the Central Government shall make rules for carrying out the provisions of the Act. The State Government revised the rules in 2005 and forwarded them to GOI for approval. The revised rules had not been approved as of August 2010.

The provisions of the Act deal with mentally ill persons in psychiatric hospitals/ nursing homes. The Act/Rules do not prescribe any qualification nor have any provision to regulate the practice of clinical psychologists, counsellors and psychiatric social workers who also have a significant role in mental health care. The Secretary, SMHA stated (November 2010) that they had requested the expert team constituted by GOI for amending the Mental Health Act to include this aspect also in the same.

State Government did not conduct any epidemiological survey to identify mentally ill persons in the State as recommended by NHRC

1.1.8.3 Role of State Mental Health Authority

Proposals of SMHA for improving the mental health care had not been approved by State Government as of August 2010

The SMHA has to advise the State Government on all matters relating to mental health. During 2005-10, the SMHA sent proposals for starting Diploma course in Psychiatric Nursing in MHC Thiruvananthapuram; setting up rehabilitation centres at the district level under District Panchayats; and for additional staff for starting inpatient treatment in the new psychiatric ward of MCH Hospital, Thiruvananthapuram. However, Government had not acted on any of these proposals (August 2010).

SMHA had not furnished to the Central Mental Health Authority the list of mental health services

Mental health services include, in addition to psychiatric hospitals and nursing homes, observation wards, day care centres, inpatient treatment in general hospitals, ambulatory treatment facilities, etc. GOI directed (May 2008) the Secretary, SMHA to send a list of such services to the Director General of Health Services for perusal of the Central Mental Health Authority. The SMHA had, however, not sent the list as of June 2010. The Secretary, SMHA stated (November 2010) that DHS had directed the District Medical Officers to prepare a list of such facilities.

The psychiatric institutions were functioning without all the minimum facilities required under the Act

The SMHA is the licensing authority under the Act. During 2005-10, 26 applications were received by SMHA from psychiatric institutions for grant of licence. Prior to 2005, 113 applications were received and these were pending for issue of licences. As of March 2010, SMHA neither granted nor refused any licence as per the provisions of the Act. The Secretary, SMHA replied (June 2010) that licensing was not introduced because provision of SMHR 1990 regarding minimum facilities required for running psychiatric hospitals were very stringent and very difficult to follow. Thus the psychiatric institutions were functioning without licence and hence were illegal under the provisions of the Act. The Secretary, SMHA stated (November 2010) that the licensing procedure would be completed within three months.

1.1.8.4 Infrastructural facilities - Buildings

As part of integrating mental health services to general health services, construction of new additional psychiatric blocks were taken up using the Central funds received for upgrading the MHCs and strengthening the psychiatric wards of MCHs. The table below indicates the details of buildings constructed using Central funds, expenditure incurred, the present status of construction and reasons for their non-occupation:

Table 1.4: Status of buildings constructed using Central funds

(` in lakh)

Name of Institution	Description	Details of Central funds received		Expenditure	Present Status (as of August 2010)/ Reason for non-occupation
		Year	Amount		
MCH, Alappuzha	New double storied building for outpatients	March 2007	30.68	5.23	Column work for the ground floor alone was completed
MCH, Kottayam	Building for academic activities	December 2007	45.20	27.00	Furniture and Equipment were not provided
MCH, Kozhikode*	Construction of psychiatric ward	November 2004	9.70	36.02	Shortage of staff

Name of Institution	Description	Details of Central funds received		Expenditure	Present Status (as of August 2010)/ Reason for non-occupation
		Year	Amount		
MHC, Kozhikode	Ward 3	October 2005	24.00	16.23	Electrical connection not provided
	Ward 4	October 2005	43.00	32.33	Electrical connection not provided
	Additional Female Ward 5	October 2005	19.00	34.47	Electrical connection not provided
	Clinical Laboratory, EEG+ECT room	October 2005	8.00	22.23	Electrical connection not provided
	Construction of a new building to accommodate Medical officer, Nursing Superintendents, etc.	October 2005	42.00	22.33	Work not started
MHC, Thiruvananthapuram	De-addiction Centre	October 2005	150.00	105.00	Work not completed
	Female Ward	October 2005	100.00	Nil	Work not yet started
MHC, Thrissur	De-addiction Ward	October 2005	10.50	11.52	Shortage of staff
	Female Ward (Sick Ward)	October 2005	8.40	8.52	Shortage of staff

(*Under the 25 per cent Central Assistance Scheme, ` 26.32 lakh met by State Government)

Source: Details furnished by MHCs and MCHs

Except for the civil works of MCH, Alappuzha which was awarded to Nirmithi Kendra, all the remaining works were entrusted with Public Works Department (PWD) as deposit works. Audit scrutiny revealed the following.

Out of 12 works, eight works were completed, two works were still to begin and one work though started in July 2008, remained incomplete

- In MHC, Kozhikode, due to delay in completion of the work, the percentage of cost over-run in respect of the clinical laboratory and the Electro Encephalogram and Electro-Convulsive Therapy (EEG+ECT) room was 178 per cent (from ` 8 lakh to ` 22.23 lakh). In respect of the additional female ward it was 81 per cent (from ` 19 lakh to ` 34.47 lakh). The PWD attributed the delay to failure of MHC to hand over hindrance-free site, revision of estimate due to change in schedule of rates and delay in finalisation and execution of agreement with the contractors.
- The PWD was still (August 2010) to take up the work of construction of the female ward for MHC, Thiruvananthapuram due to delay in handing over the site, cutting and removal of trees, etc. The de-addiction ward started during August 2006 at a cost of ` 1.50 crore had been completed only partially.
- The Superintendent, MCH, Alappuzha released (July 2008) ` 14.50 lakh to Nirmithi Kendra for the construction of a building for outpatients. Joint verification by the audit team and the Superintendent, MCH, Alappuzha revealed that though the work was started in July 2008, it remained at a standstill after column work of the ground floor had been done at a cost of ` 5.23 lakh. In April 2010, the MCH proposed to Government to transfer the work from Nirmithi Kendra to PWD. Audit observed that lack of proper co-ordination between the MCH and Nirmithi Kendra was the main reason for the delay in executing the work.

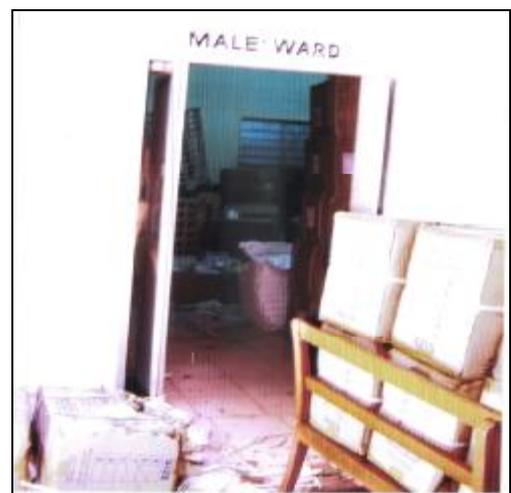
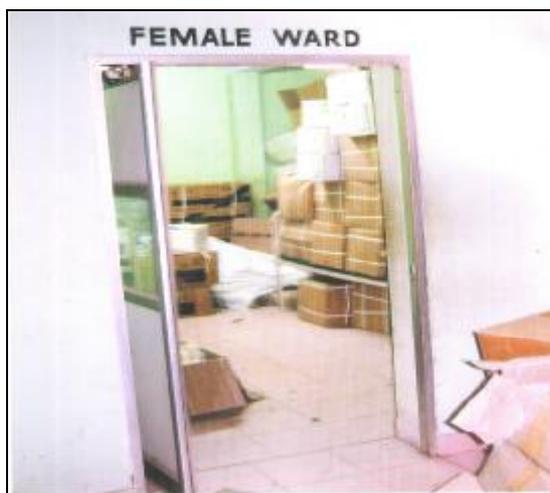


Incomplete building for outpatient in MCH, Alappuzha.

- In MHC, Thrissur, two buildings completed in January 2010 were lying unutilised due to shortage of staff.

Thus the buildings constructed using Central funds could not be put to beneficial use for patients due to inordinate delay in completion of the buildings despite availability of sufficient funds. The Secretary, SMHA stated (November 2010) that steps would be taken to complete the buildings and make them useful.

It was also seen in audit that psychiatric wards (for both male and female) with a Behavioural Intensive Care Unit constructed in March 2005 (cost: ` 10 lakh) at District Hospital, Kollam were not put into use due to defective construction (viz. a deep crack in the roof of female ward; lavatory side of the female ward sinking two feet down) and were being used as store rooms. A joint verification revealed that medicines and gloves stored in these rooms had become damp as the roof of the building was leaking heavily. The Secretary, SMHA stated (November 2010) that steps would be taken to make the unit functional.



Wards at psychiatric wing of District Hospital, Kollam used as storage rooms

1.1.8.5 Bed strength and occupancy

Bed strength and average occupancy per day during 2005-10 in MHCs (Kozhikode, Thiruvananthapuram, and Thrissur) revealed that the percentage

of occupancy ranged between 102 and 118. The excess occupancy was due to overstaying of improved patients, heavy admission of relapsed cases, non-utilisation of new wards due to shortage of staff and non-completion of works, etc. Overstaying of patients was due to non-availability of adequate rehabilitation centres, non-availability of proper address of the patients who were admitted by court orders, non-acceptance of recovered patients by their families etc.

The three MCHs had a total bed strength of 154¹¹. The average bed occupancy per day during 2005-10 was 42, 40 and 18 in MCHs, Thiruvananthapuram, Kozhikode and Thrissur respectively. In MCHs, Thiruvananthapuram and MCH, Kozhikode even though the bed strength of psychiatric wings was increased by 14 and 24 respectively by constructing (2002) additional units, these units had not started functioning as of August 2010 for want of paramedical staff. The Secretary, SMHA stated (November 2010) that steps would be taken to make the buildings functional.

1.1.8.6 Functioning of Psychiatric units of District and Taluk Headquarters Hospitals

Psychiatric units were started only in four THQ hospitals out of nine units sanctioned in nine THQ hospitals

In the affidavit filed (June 2002) by the State Government before the Supreme Court it was stated that provision had been made in the budget (2002-03) for establishing psychiatry units in all district hospitals and that in the next phase psychiatric units would be established in Taluk Headquarters hospitals as well. There were 14 district hospitals and 63 Taluk Headquarters (THQ) hospitals in the State. The DHS, Thiruvananthapuram accorded (December 2003 and October 2004) sanctions for starting psychiatric units in nine¹² THQ hospitals by utilising the available facilities and manpower. However, the department started psychiatric units only in four¹³ (out of nine) THQ hospitals during 2005-06. Except for a psychiatrist, Government did not sanction the paramedical staff in the four hospitals so far (August 2010). While no unit was started in other THQ hospitals such as Karunagappally, Mannarkad, Muvattupuzha, Neyyattinkara and Ottappalam, one unit started (2005) at Nedumangad was closed down from April 2010 for want of psychiatrists. Out of a total 63 THQ hospitals, psychiatric units were yet to be started in 59 such hospitals. The action of the Government in not starting adequate number of psychiatric units with supporting staff was against the affidavit filed before the Supreme Court. The Secretary, SMHA stated (November 2010) that psychiatry units would be started in THQ hospitals subject to availability of psychiatrists.

1.1.8.7 Behavioural Intensive Care Units

Behavioural Intensive Care Units in MHCs at Thrissur and Kozhikode were not functioning due to shortage of staff

A full-fledged Behavioural Intensive Care Unit (BICU) to accommodate mentally ill patients with violent behaviour was functioning in MHC, Thiruvananthapuram from November 2006. Two buildings were constructed in MHC, Thrissur and Kozhikode (2005-07) at a cost of ` 8.29 lakh and ` 12 lakh respectively for setting up of BICUs. However, these units were not started due to non-availability of paramedical staff. The Secretary, SMHA

¹¹ Kozhikode: 71, Thiruvananthapuram: 43 and Thrissur: 40

¹² Chirayinkil, Karunagappally, Mannarkad, Mavelikara, Moovattupuzha, Nedumangad, Neyyattinkara, Ottappalam, Tirur.

¹³ Chirayinkil, Mavelikara, Nedumangad, Tirur

stated (November 2010) that steps would be taken to make the units functional.

1.1.8.8 Admission and treatment of mentally wandering/under-trial ill patients

On reception orders¹⁴ passed by the respective Magistrates under Section 24 of the MHA 1987, 2023 wandering mentally ill persons and seven under-trials were admitted (2005-09) and treated in the three MHCs¹⁵ test-checked. The MHC, Thiruvananthapuram made special efforts to send back all the 714 wandering patients after treatment to their respective homes. In MHC, Kozhikode, 396 patients were sent back while MHC, Thrissur could send back only five patients (August 2010). The Secretary SMHA stated (November 2010) that maximum efforts were being made to trace the addresses of the wandering patients.

1.1.8.9 Institute of Mental Health and Neuro Sciences

The Institute of Mental Health and Neuro Sciences (IMHANS) was constituted in June 1983 as a society registered under the Societies Registration Act, 1860. The control, administration and management of the society of the IMHANS was vested in the Governing Body consisting of the Minister of Health as Chairman and Government Officers¹⁶ as members. During the period 2005-10, the Institute had taken up the District Mental Health Programme (DMHP) for Wayanad and Community Mental Health Programme (CMHP) under the National Rural Health Mission for Kasargode, Malappuram and Kozhikode on the lines of DMHP. The Institute also monitored the rehabilitation centre for improved patients of the MHC, Kozhikode. The implementation of the DMHP/CMHP in four districts (Kasargode, Kozhikode, Malappuram and Wayanad) by IMHANS helped to reduce the workload of MHC, Kozhikode as evidenced by the reduction (22.61 *per cent*) in intake of inpatients at MHC, Kozhikode from 31,802 (2005) to 24,610 (2009). According to the cost-effect analysis of the MHC, Kozhikode made by the Institute during the year 2009, there was saving of 26.15 *per cent* in expenditure on diet, medicine and drugs due to reduction in intake of inpatients.

1.1.8.10 Occupational Therapy

Occupational therapy is the application of goal directed, purposeful activity in the assessment and treatment of individuals with psychological, physical or developmental disabilities. In MHCs, Thiruvananthapuram and Thrissur, 63 and 45 improved patients respectively were engaged daily during 2005-10 in various occupational therapy units such as soap making, cover making, stitching, bakery, candle making, etc. In MHC, Kozhikode, no creative and functional occupational therapy unit was functioning, although there was a post of occupational therapist. The Secretary, SMHA stated (November 2010) that steps would be taken to start occupational therapy units in MHC, Kozhikode.

¹⁴ An order authorizing the detention of a patient in a psychiatric hospital.

¹⁵ Kozhikode:1022, Thiruvananthapuram:721 (including seven under -trials), Thrissur:287.

¹⁶ Secretary, Health Department as Vice-Chairman, Secretaries of Departments of Finance, Planning, etc., as members.

1.1.8.11 Rehabilitation

Rehabilitation is one of the important components in the mental health care facility. As per the Mental Health Policy, the rehabilitation centres were to be centered around standard referral institutions. The Mental Health Policy also envisaged establishment of day care centres at the block and district levels. There were 14 districts and 152 blocks in the State. The Social Welfare Department which had the responsibility of rehabilitation of chronically mentally ill patients under the Persons with Disabilities (PWD) Act 1995, had only six Asha Bhavans¹⁷, under its control. Besides two rehabilitation centres under the District Panchayat, Thiruvananthapuram and five centres at Block level were functioning in the State.

The Secretary, SMHA had sent (September 2007) proposals to the State Government for establishment of rehabilitation centres in the remaining 13 districts under the control of the respective District Panchayats, the sanction for which is pending with the Government (August 2010).

1.1.8.12 Functioning of NGOs/Private Institutions getting financial assistance from Central/State Government

Minimum facilities as required under SMHR were not available in five de-addiction centres (under NGOs) test-checked

The Government/SMHA did not have the details of the total number of psychiatric hospitals/nursing homes, de-addiction centres, rehabilitation centres, care homes, day care homes, etc., functioning in the State. Independent scrutiny by Audit revealed that 17 de-addiction centres and three rehabilitation centres for mentally ill patients in Kerala were getting grants-in-aid from the Ministry of Social Justice and Empowerment from 2005-06 onwards. Test check of seven institutions (five de-addiction centres and two rehabilitation centres) under five out of the eight test-checked NGOs revealed that minimum facilities such as manpower, support facilities like Electro Convulsive Therapy, recreational activities, etc., required under Rule 22 of the SMHR were not available in the five de-addiction centres. It was also seen that only three institutions (Bodhi and Karma under Abhaya, Thiruvananthapuram and St. Josephs's Bhavan, Thrissur) were registered with the Social Welfare Department under Section 51 of the Persons with Disabilities Act, 1995. Further, all the seven institutions had not got licenses under Section 6 of MHA, 1987. However, all these institutions received grant-in-aid of ` 2.32 crore during 2005-10 from GOI.

1.1.9 Human Resources Management

1.1.9.1 Manpower

According to Rule 22 of the State Mental Health Rules, 1990, there should be one psychiatrist and one clinical psychologist/social worker for a 10-bedded hospital or nursing home. In addition, one staff nurse and one attender was to be provided for every three and five patients respectively.

Shortage of manpower in three MHCs ranged between 64 and 94 per cent

The shortage of manpower in various categories in the three MHCs ranged between 64 and 94 *per cent*. The shortfall was due to lack of qualified psychiatrists, clinical psychologists, psychiatric nurses and social workers. The Secretary, SMHA stated (November 2010) that a proposal to create

¹⁷ Asha Bhavans are rehabilitation homes under the Social Welfare Department to accommodate the mentally cured patients discharged from MHCs.

necessary posts in a uniform pattern in all the three MHCs was under consideration of the Government.

In District/Taluk Headquarters hospitals test-checked, there were shortages of personnel in all posts except psychiatrist (except in District Hospital, Ernakulam where there was excess manpower of psychiatrist and clinical psychologist). Thus, due to shortage of staff, the facilities contemplated under the Act for quality health care could not be provided. Details of shortage of staff are given in **Appendix I**.

The Secretary SMHA stated (July 2010) that the annual turnout from all the Medical Colleges was nine psychiatrists with postgraduate degree (MD), seven psychiatrists with Diplomas in National Board Examination and five psychiatrists with Diplomas in Psychiatric Medicine (DPM). The annual turnout of qualified nurses in psychiatry from two Medical Colleges and 18 Nursing Schools was only 495. To overcome the heavy shortage of qualified psychiatrists, the SMHA proposed (September 2009) to Government that a postgraduate course in psychiatry should be made compulsory for any private organization seeking permission to start new medical colleges.

While conducting a study on the quality of mental health care, NHRC also pointed (2008) the need to start postgraduate courses like DPM and MD in all the MHCs, to change the staffing pattern depending on the number of beds, to organize in-service training programmes, to identify one mental hospital in each State or region as a training centre, etc. However, the recommendations were not implemented (July 2010). The Secretary, SMHA stated (November 2010) that a proposal for a uniform pattern of staff patient-ratio in all the three MHCs was pending with Government, in-service training was conducted in all the three MHCs and the Institute of Mental Health and Neurosciences, Kozhikode had been identified for upgrading as a centre of excellence and would function as a training centre.

1.1.9.2 Training of staff

The National Human Rights Commission in its Report (November 2005) on MHC Thiruvananthapuram reiterated the need for Psychiatric Social Workers to undergo a two-year training in psychiatric social work at the National Institute of Mental Health and Neuro Sciences, Bangalore or at Central Institute of Psychiatry or at Ranchi Institute of Psychiatry and Allied Sciences. This suggestion had not been favourably considered by Government. NHRC also observed that none of the nurses working in the MHC was qualified in psychiatry. Audit scrutiny revealed that the position in the other two MHCs (Thrissur and Kozhikode) was also not different. Presently, the general nurses were being imparted in-house training in psychiatry for a period of 15 to 21 days annually in Thiruvananthapuram. In Thrissur, no training was given in 2005-06 and 2009-10, whereas only 12, 6 and 29 general nurses were trained in 2006-07, 2007-08 and 2008-09 respectively. In Kozhikode, training was given to 15 nurses each in 2005-06 and 2006-07, 27 in 2008-09 and 20 in 2009-10. No training was given in 2007-08. The Secretary, SMHA stated (November 2010) that steps would be taken to impart inservice training to a maximum number of paramedical staff.

Recommendations of NHRC to train the paramedical staff in reputed institutions outside the State had not been implemented

1.1.10 Monitoring

1.1.10.1 Mental Health Centres

As per the directions of the Kerala High Court (January 1998), a monitoring committee with District Judge as chairman and two other members was functioning in all the three MHCs. The committee met every quarter and reported directly to the High Court. The decisions taken in the meetings were minuted and follow up action taken promptly.

1.1.10.2 Inspection

No inspection of psychiatric hospitals/nursing homes was carried out by the Inspectors

Section 13 of the Act requires that an inspecting officer may, at any time enter and inspect any psychiatric hospitals/nursing homes and require the production of any records and interview in private any patient receiving treatment. Government appointed in January 2003 and October 2009, four inspectors each in all the 14 districts to discharge the functions and duties contemplated under the Act. However, the inspectors could not conduct inspection of psychiatric hospitals/nursing homes except in five institutions which were inspected based on court orders. The Secretary, SMHA stated (June 2010) that non-issue of licences was the reason for non-compliance of the provisions of Section 13 of the Act. The results of inspection of these five institutions were not made available to Audit and consequently, the penal action, if any, taken under Section 82 of the Act, could not be verified.

No Board of Visitors was appointed for private psychiatric hospitals/nursing homes

Section 37 of the Act stipulates that the State Government was to appoint Board of Visitors, consisting of not less than five visitors of whom one should be a medical officer, preferably a psychiatrist and two social workers, for every psychiatric hospital and every psychiatric nursing home. Section 38 of the Act requires the Board of Visitors to make a verification of every part of the psychiatric hospitals and nursing homes in respect of which they have been appointed. However, the Boards of Visitors were appointed for the three Government MHCs only. No Board of Visitors was appointed for private psychiatric hospital/nursing home. The Secretary, SMHA stated (November 2010) that the Boards of Visitors were not appointed due to delay in the licencing process. Hence, Government could not ensure that human rights contemplated under Section 81 of MHA are not violated in the case of inmates of these private psychiatric institutions.

1.1.10.3 Protection of human rights

Section 81 of the MHA Act provides for protection of human rights of mentally ill persons. The NHRC in its Report (2008) on 'Quality of Mental Health Care', *inter alia*, recommended that (i) each hospital should have a medical records section headed by an officer trained in handling of medical records. If possible, the file retrieval system should be computerized, (ii) there should be a separate estate department for preservation of and maintenance of the estates, lands, properties and infrastructure of the hospital, (iii) there should be better co-ordination between the Health Department and Social Welfare department and for this NHRC suggested that a member from the Social Welfare Department could be a member of the SMHA and a member from the Health department could be a member of the State Co-ordination Committee formed under the Persons with Disabilities Act.

The Secretary, SMHA stated (November 2010) that computerisation of medical records in MHC, Thiruvananthapuram has been completed and steps would be taken to provide the facility in the other two MHCs also. The remaining two recommendations had not been implemented (November 2010).

1.1.11 Conclusion

The State Government had not formulated a mental health plan to implement the objectives envisaged in the Mental Health Policy, 2000. About 50 *per cent* of the Central funds received for providing additional facilities to patients in Mental Health Centres and psychiatric wards of Medical College Hospitals remained unspent. The State Government did not conduct any epidemiological survey to identify mentally ill persons in the State as recommended by the National Human Rights Commission. The State Mental Health Authority did not issue licences to 26 applicants who applied for licence during 2005-10 to start psychiatric institutions and psychiatric nursing homes in the State, which resulted in functioning of these institutions without valid licences. The shortage of manpower in the three Government Mental Health Centres ranged between 64 and 94 *per cent*. Inspections of the psychiatric hospitals/nursing homes were not carried out by the Inspectors. No Boards of Visitors were appointed for private psychiatric hospitals and nursing homes. The review revealed good performance of IMHANS in the field of rehabilitation of mentally ill patients and that of the three Government Mental Health Centres in admission, treatment and discharge of wandering/under-trial patients and the monitoring mechanism instituted at these Centres.

1.1.12 Recommendations

- Government should formulate a Mental Health Plan to achieve the objectives of the Mental Health Policy.
- Government should consider conducting an epidemiological survey to identify mentally ill persons in the State as recommended by National Human Rights Commission.
- Government should ensure that the psychiatric institutions function with the minimum facilities required under the Act.
- Government should initiate steps to amend the Act/Rules to prescribe qualifications and to regulate the practice of clinical psychologists, counsellors and psychiatric social workers.
- Government should provide adequate staff in the Mental Health Centres and peripheral institutions.
- Government should foster effective co-ordination between the Health and Social Welfare Departments to address the issue of rehabilitation of mentally ill/cured patients.
- The monitoring mechanism on the functioning of private psychiatry institutions should be strengthened.

The above points were referred to Government in September 2010, reply had not been received (November 2010).

HIGHER EDUCATION DEPARTMENT

1.2 Functioning of the University of Kerala

Highlights

The University of Kerala, which came into being in 1957, has 40 academic departments under 16 faculties, one Engineering College, 10 Teacher Education colleges, nine Institutes of Technology and 213 affiliated colleges besides an Institute of Distance Education. It also has an Academic Staff college to impart training to teachers. The Boards of Studies met every year as stipulated in the Statutes and revised the syllabus for all under-graduate courses in tune with the choice based credit and semester system introduced from 2010. The Academic Staff College of the University was ranked first among all the Universities by University Grants Commission on the basis of programmes conducted and participation during the Tenth and Eleventh Plan periods. During the review period from 2004-2010, the University conducted examinations on scheduled dates and results were declared on time. However, certain courses offered by the University did not attract enough candidates leading to low enrolment. Deficiencies like shortage of regular teaching staff, lack of infrastructural facilities, shortfall in internal audit, etc. were noticed during the performance review.

Annual Action Plans were not being prepared by the University except in the case of conduct of examinations.

(Paragraph 1.2.6)

No pension fund was constituted by the University to meet increasing pensionary liabilities.

(Paragraph 1.2.7.4)

Deductions made towards provident fund from the salaries of the employees during 1990-95 were not remitted into the separate account maintained for the purpose but were used for meeting establishment expenditure which resulted in a deficit of ` 30.03 crore in the provident fund accumulations of the employees as at the end of 2007-08.

(Paragraph 1.2.7.6)

Out of ` 15.95 crore allocated by the University Grants Commission towards the General Development Grant for the Eleventh Plan Period (2007-12), the University could utilise only ` 3.40 crore (22 per cent) up to August 2010.

(Paragraph 1.2.7.8)

Three courses introduced during 2001-03 by the Institute of Distance Education and two innovative courses introduced by the Departments/Centres of the University had to be discontinued due to poor response from candidates.

(Paragraph 1.2.8.2)

The Department of Aquatic Biology and Fisheries did not have an aquarium attached to it for conducting practical studies.

(Paragraph 1.2.8.3(i))

Palm leaf manuscripts were not preserved as per the guidelines of the Indian National Trust for Art and Cultural Heritage.

(Paragraph 1.2.8.3(iv))

Students who had not qualified in the entrance examinations were admitted in six affiliated engineering colleges during 2008 and 2009.

(Paragraph 1.2.8.5)

The Scrutiny Boards constituted for checking question papers were not functioning effectively.

(Paragraph 1.2.8.6)

Changes in final marks on revaluation ranged between 56 and 59 per cent in test-checked cases. The delays in completion of revaluation of answer scripts ranged between 95 and 328 days against the stipulated period of 45 days.

(Paragraph 1.2.8.7)

Five research projects taken up by the Head of the Department of the Aquatic Biology Department during 2000-05 had not been completed.

(Paragraph 1.2.9.2)

The shortage of regular teaching staff in six departments ranged between 50 per cent and 80 per cent.

(Paragraph 1.2.10.1)

The shortage of personnel in the post of Assistants was 48 per cent as of March 2010.

(Paragraph 1.2.10.2)

Internal audit of 27 out of 40 academic departments was not conducted after 2005-06.

(Paragraph 1.2.13.1)

1.2.1 Introduction

In 1957, the Kerala University Act was brought into force and the erstwhile University of Travancore (established in 1937) was renamed as the University of Kerala. The University of Kerala has jurisdiction over the southern districts of Kerala viz. Thiruvananthapuram, Kollam, Alappuzha, and parts of Pathanamthitta.

The University has 40 postgraduate teaching and research departments under 16 faculties and 213 affiliated colleges. The University is also running 33 Academic Study Centres, nine University Institutes of Technology, 10 Teacher Education Colleges, one Engineering College, a Department of Physical Education and an Institute of Distance Education. It also has an Academic Staff college to impart training to teachers. The University also provides support services viz. computer centre, library, engineering wing for construction and maintenance, printing press, publication division, health centre, hostels and guest houses.

The main functions of the University are to impart instruction in various branches of learning, undertake research; disseminate knowledge; conduct examinations; grant/confer degrees, diplomas and other academic distinctions as well as provide infrastructure. The University offers graduate/postgraduate

courses through its departments, the Institute of Distance Education and affiliated colleges in various disciplines. The University grants affiliation to Government and private colleges on due fulfilment of conditions prescribed.

1.2.2 Organisational set-up

The affairs of the University are guided and controlled by a Senate of elected members and a Syndicate elected by the Senate members. The Governor of the State is the Chancellor and the Minister for Education of the State is the Pro-Chancellor. Administration of the University is vested with the Vice-Chancellor who, in turn, is assisted by a Pro Vice-Chancellor in academic matters. The Vice-Chancellor is assisted by the Registrar in general administration, by the Controller of Examinations in the conduct of examinations and by the Finance Officer in financial matters.

1.2.3 Audit objectives

The objectives of the performance audit were to ascertain whether:-

- Ø there was proper planning of the various activities of the University;
- Ø the financial management resulted in economic, efficient and effective mobilization and utilization of resources;
- Ø the academic programmes were efficiently managed in accordance with the norms prescribed by various funding agencies and adequate infrastructure were provided;
- Ø the research activities were undertaken in accordance with the norms of the funding agencies and research findings were properly disseminated;
- Ø the human resources were adequate and as per norms to improve the quality of education;
- Ø the administrative matters including support services were managed effectively and efficiently and
- Ø there existed an effective internal control system.

1.2.4 Audit criteria

The following criteria were adopted for the Performance Audit:

- Ø The Kerala University Act, 1974, The Kerala University First Statutes, 1977, The Kerala University First Ordinances, 1978, Kerala Financial Code and Kerala Service Rules.
- Ø Guidelines and orders of the Government of Kerala/ Government of India/University Grants Commission,
- Ø Minutes of the meetings of the Syndicate, Academic Council, Financial Committee, etc.,
- Ø Annual administrative reports, annual accounts, audit reports of Director of Local Fund Accounts, internal audit reports, etc.

1.2.5 Audit coverage and methodology

The performance audit was conducted during April to August 2010 covering the period 2004-05 to 2009-10, by test check of the records of the University Administrative office, the Institute of Distance Education, the Engineering

wing, the Academic Staff College, the University library and the University printing press. In addition, 12¹⁸ (out of 40) academic departments were selected using the simple random sampling method. Five study centres¹⁹ and the engineering college run by the University were also covered. An entry meeting was conducted (June 2010) with the Principal Secretary to Government, Higher Education Department and the Registrar of the University to discuss the audit objectives and an exit meeting was conducted (October 2010) with the same officers to discuss the audit findings and recommendations.

Audit Findings

1.2.6 Planning

Planning provides a clear sense of direction to the activities of any organization and is an important process to bring about effective integration of various activities. Planning was, therefore, essential in the University in the management of its financial resources, human resources and academic activities. It was observed that the University had no comprehensive Annual Action Plan or Action Plan for a definite period to implement its various programmes except in respect of the conduct of examinations. Though the University submitted Action Plans to the University Grants Commission (UGC) for getting development grants and Annual Action Plan each year to the State Government for getting Plan/Non-Plan assistance, these Plans were not comprehensive in nature. The Finance Officer (in-charge) stated (November 2010) that the audit observations would be placed before the Senate and the Syndicate of the University for consideration.

1.2.7 Financial management

The University is mainly financed through block (Non-Plan) grants from the State Government, Plan grant from Government of India, UGC and project grants from other Central and State Government organisations. The University also generates its own income by way of fees from students, affiliation fee from private colleges, sale of study materials, forms, publications, etc.

1.2.7.1 Receipts and expenditure

The details of receipts and expenditure during the period 2004-05 to 2008-09 are furnished in **Table 1.5**.

Table 1.5: Receipts and expenditure of the University of Kerala

(` in crore)

Year	Receipts				Expenditure		
	Non-Plan ²⁰	Plan	Internal receipts	Total	Non-Plan	Plan	Total
2004-05	43.91	13.00	27.75	84.66	61.94	8.43	70.37
2005-06	48.28	11.07	27.40	86.75	67.77	11.93	79.70

¹⁸ Department of Aquatic Biology & Fisheries, Bio-Chemistry, Bio-Technology, Chemistry, Computer Science, Communication & Journalism, Economics, Institute of Management, Mathematics, Opto Electronics, Oriental Research Institute & Manuscripts Library and Physics.

¹⁹ Centre for Bio-informatics, Centre for Geo-information Science, Centre for Nano Science and Nano Technology, Centre for Kerala Studies and Centre for Performing Arts.

²⁰ Block grant received from State Government

Year	Receipts				Expenditure		
	Non-Plan ²⁰	Plan	Internal receipts	Total	Non-Plan	Plan	Total
2006-07 ²¹	53.10	18.95	31.48	103.53	82.88	11.11	93.99
2007-08	55.00	17.84	36.80	109.64	104.12	12.15	116.27
2008-09	58.85	20.89	43.77	123.51	102.97	17.61	120.58
Total	259.14	81.75	167.20	508.09	419.68	61.23	480.91

Source : Annual accounts of the University

- Out of the total Plan allocation of ` 81.75 crore, the University could utilise only ` 61.23 crore. Major savings (42 per cent) were noticed under development grant received from Government of India and UGC.
- There was an average increase of 25 per cent under Non-Plan expenditure (mainly under salaries and pension) during 2007-08 and 2008-09 due to implementation of pay revision. However, there was no corresponding increase in Non-Plan grants from the State Government during these years, commensurate with the increased liabilities.

1.2.7.2 Unrealistic proposals in annual budget

Every year, the University prepares estimates for receipts and expenditure under Non-Plan. Scrutiny by Audit revealed that there was wide variations between the estimates and actual receipts/expenditure as detailed below;

Table 1.6: Year-wise estimates of receipts and expenditure and actuals under Non-plan
(` in crore)

Year	Receipts (Non-Plan)			Expenditure (Non-Plan)		
	Estimate	Actual	Variation (percentage)	Estimate	Actual	Variation (percentage)
2004-05	81.89	71.65	10.24 (13)	96.74	61.94	34.80 (35)
2005-06	93.23	75.67	17.56 (19)	104.59	67.77	36.82 (35)
2006-07	95.69	84.57	11.12 (12)	107.63	82.88	24.75 (23)
2007-08	100.56	91.80	8.76 (9)	114.69	104.12	10.57 (9)
2008-09	130.39	102.62	27.77 (21)	139.83	102.96	36.87 (26)

Source: Data furnished by University

It was noticed that Non-Plan expenditure proposals of the University was unrealistic in all the years except 2007-08. The excess over the actuals ranged between 23 and 35 per cent except in 2007-08. The University stated (April 2010) that the reason for the savings was inclusion of pay and allowances in respect of sanctioned posts instead of on the actual number of employees.

1.2.7.3 Fellowships and Scholarships

During the period 2004-09, the University received ` 9.96 crore from UGC, Government of India, State Government, agencies under Central and State towards payment of fellowships/scholarships to students, out of which ` 6.72 crore (67 per cent) was disbursed. Audit observed that non-disbursement of 33 per cent of the funds was due to inability of the students to claim the scholarships/fellowships as they were already in receipt of scholarships/fellowships under different schemes. The University should have refunded the undisbursed amounts to the funding agencies as it was not possible to disburse the amount after the expiry of the year to which they were released.

²¹ Provisional figures

Pensionary liabilities were on the increase from 2007-08 and no pension fund was constituted to meet this liability

1.2.7.4 Non-constitution of pension fund

Teaching and non-teaching staff of the University are entitled to pension as provided in the Kerala Service Rules. Being the 'Mother University' of the State, the University of Kerala has an enormous pension liability, which is increasing year after year. Constitution of a separate pension fund was essential to meet the ever increasing pensionary liabilities and also to have proper control over the financial resources. It was observed that the University had incurred ` 109.25 crore towards expenditure on pensionary benefits during 2004-09 and there was considerable increase in pensionary liabilities from 2007-08 onwards. The estimated pension commitment for 2009-10 was ` 31.75 crore. Presently, pensionary charges were being met from the general revenues of the University. This huge liability would eventually lead to a financial crisis as no pension fund was constituted by the University despite observations made by the Statutory Auditor in this regard in the Audit Report finalized every year, the latest being for the year 2005-06. The Finance Officer (in-charge) stated (June 2010) that the Syndicate had, in principle, decided to constitute a pension fund and the same would be implemented after constitution of the new Syndicate.

1.2.7.5 Annual Accounts

Section 47 of the University Act provides for preparation and submission of Annual Accounts to the Government. The due date for submission of accounts to the Government and the method for its preparation are not prescribed in the Act/Statute. The Director of Local Fund Audit is the Statutory Auditor of the University.

Scrutiny of the accounts revealed that balances in the personal deposit accounts maintained by the University Institute of Technologies and Teacher Education Colleges were not included in the accounts. Similarly, the balances under Department Development funds constituted by the academic departments by collecting special fees from students were also not disclosed in the accounts. Hence, the annual accounts did not reflect the correct financial position of the University. The audit of accounts had been completed only up to 2005-06. The Finance Officer (in-charge) stated (April 2010) that accounts up to 2008-09 had been submitted²² to the Director of Local Fund Audit.

1.2.7.6 Diversion of University Provident Fund

Non-remittance of deductions towards GPF made from employees salaries to the Provident Fund account during 1990-95

The University constituted a Provident Fund as per the University Act and transactions relating to this fund were being carried out through a Savings Bank account opened in a Public Sector Bank. The provident fund deductions effected from the salaries of the employees during the period 1990-95, were not credited to the bank account by the University (due to acute financial stringency) and the amount was utilised for meeting establishment expenditure. Scrutiny by Audit revealed that the balance in the bank account was only ` 12.94 crore, at the end of 2007-08, whereas the closing balances of all individual subscribers at the end of 2007-08 was ` 42.97 crore, including interest. Thus there was a deficit of ` 30.03 crore. The University had not recouped the above deficit so far (October 2010). The Finance Officer (in-charge) had confirmed (July 2010) the audit observation and stated that though

²² 2006-07 : December 2007, 2007-08 : March 2009, 2008-09 : December 2009

the University had requested, the Government for an increase in its block grant to make good the deficiencies, Government had not responded positively. He stated (November 2010) that an amount of ` one crore would be earmarked every year from 2011-12 for deposit in the provident fund account and the same could be implemented after constitution of the new Syndicate.

1.2.7.7 Utilisation of funds released to Study centres

The State Government provided (2008-09) ` five lakh and ` 25 lakh respectively to two study centres, viz. the VK Sukumaran Nair Chair to provide opportunity to young men and women to get expertise in parliament affairs and the Mahatma Ayyankali Chair to propagate the ideas of Mahatma Ayyankali on social reforms, to document the literature and to digitalize the same. Audit observed that the funds received were unutilised and kept in fixed deposits (October 2010). Non-functioning of these centres after receiving sufficient grant defeated their objectives.

1.2.7.8 Under-utilisation of General Development Grant

University Grants Commission had released ` four crore to the University towards General Development Grant during the Tenth Plan period (2002-07) and the University utilised ` 3.60 crore by March 2007. The UGC allocated ` 15.95 crore to the University for the Eleventh Plan period (2007-12) and released ` 5.75 crore in seven instalments till August 2010. Out of this, the University so far utilised (August 2010) only ` 3.40 crore due to lack of planning. The University did not also furnish (October 2010) utilisation certificates for the released amount which resulted in non-release of subsequent instalments. As the University failed to utilise one-third of the allocation received in spite of two-thirds of the Plan period elapsing, the utilisation of the balance two-third portion of ` 10.20 crore within the remaining Plan period would need concerted action by the University. Otherwise, a sizable portion of the allocated funds would lapse, which would adversely affect the allocation for the next Plan period.

1.2.8 Academic activities

The deficiencies and shortcomings noticed in the academic activities are discussed below;

1.2.8.1 Boards of Studies

As per Chapter XI of the Kerala University First Statute, 1977 there should be a Board of Studies (BOS) attached to each subject of study or groups of subjects in the University, to initiate steps to revise the syllabus and restructure the courses in tune with the modern trends and developments in the respective branches of knowledge and make recommendations to the faculties concerned. There are separate BOS for undergraduate (UG) and postgraduate (PG) courses. At present there are 96 Boards of Studies under the University. Scrutiny by audit revealed that all the Boards of Studies met every year as stipulated in the statutes and these were reconstituted every three years. In the meeting held on 22 March 2010, the Academic Council decided to implement the restructured revised syllabus for all UG courses in tune with the choice based credit and semester system introduced from 2010. However, the deficiencies noticed in the constitution of BOS are detailed below;

- (i) As per Chapter XI of the Kerala University First Statute, 1977 each BOS for UG courses should consist of a teacher from the University department, three teachers in the subject from Government colleges and an outside expert. However, in the BOS constituted (2006) for the subject 'Bio-technology' there was no outside expert. In the BOS constituted (2005) for Chemistry there was no representation from the University department. The BOS constituted (2003 and 2006) for Polymer Chemistry included an outside expert who was not related to the subject.
- (ii) A teacher nominated to the BOS for UG courses and PG courses should have 15 years and 20 years of teaching experience respectively. Three members of BOS (constituted during 2004-08) for the UG course on Philosophy and one member for the PG course on Sociology (constituted during 2004-08) had teaching experience ranging between five and 13 years only.

Details of experience/qualification of all members of the various Boards of studies were not made available to Audit. Accepting the audit observations, the Registrar stated (August 2010) that the matter would be brought to the notice of the Syndicate while reconstituting the BOS.

1.2.8.2 *Innovative Courses*

To cope with the changing scenario, the University introduced new courses by using own resources or with assistance from UGC under its various departments, based on the proposals submitted by them. Scrutiny by Audit revealed the following deficiencies in the courses sanctioned/introduced during the review period.

- (i) The University introduced six innovative courses under the innovative programme for teaching and research in inter-disciplinary and emerging areas during 2004-05 to 2009-10 under various departments/centres with financial assistance from UGC. Audit observed that, one out of six courses viz., PG Diploma in Theatrical Arts (sanctioned in May 2007) under the Department of Sanskrit with intake capacity of 40 students was not started due to poor response from students. The UGC however, sanctioned ` 24 lakh for this purpose and released the first instalment of ` 11.30 lakh in June 2007. Though the courses were notified during 2008-09 and 2009-10, only two and four applications respectively were received for admission. Hence, the courses were not started and the funds remained unutilized (October 2010). The Director (Planning and Development) stated (July 2010) that the poor response was due to lack of initiative from the Head of the Department who was the Course Co-ordinator.
- (ii) A PG Diploma course in Convergence Media in the Centre for Convergent Media Studies was started in 2005-06 in collaboration with the Centre for Imaging Technology (C-DIT) with a fee of ` one lakh with intake capacity of 30 students. Nine students had registered for the first batch and 16 for the second batch. The course was discontinued from 2007-08 due to poor response from students as only two students applied for the third batch. As per the note submitted

Two innovative courses started during 2004-2010 failed to take off due to low publicity and poor response of candidates

(July 2007) by the Course Co-ordinator to the Vice-Chancellor, the poor response was due to high fees and poor placement opportunities. Out of eight successful candidates of the first batch, only three got employment. The infrastructure created by the University in connection with the course at an expenditure of ₹ 33.12 lakh thus remained idle (August 2010).

Three courses introduced by Institute of Distance Education had to be discontinued due to poor response from candidates

- (iii) The Institute of Distance Education (IDE) introduced three²³ courses during 2001-02 and 2002-03 but had to discontinue these courses during 2004-05 (one course) and 2007-08 (two courses) as only two to four students were registered for these courses. Similarly two²⁴ courses notified in 2009 failed to commence due to poor response. Introduction of courses without conducting proper planning and survey among the student community resulted in discontinuance of the courses in the midway/non-commencement of courses.

In the exit meeting, the Registrar stated that no system of conducting demand surveys or need-based assessment before introduction of new courses was in vogue. New courses were started as per the suggestions received from concerned departments and with the approval of the Syndicate. The Director of Institute of Distance Education stated (April 2010) that a research cell had been started (2010) by IDE for conducting pre-course research.

1.2.8.3 Infrastructure facilities in Academic Departments

The University should provide adequate infrastructure facilities for learning and research activities. Out of 12 departments test-checked infrastructure deficiencies were noticed in four departments, as detailed below:

(i) Department of Aquatic Biology and Fisheries

The Department of Aquatic Biology and Fisheries was functioning without an aquarium attached to it for conducting practical studies

Aquatic Biology is the study of ecology and behaviour of plants, animals and microbes living in the sea, fresh water lakes, ponds, rivers and wet lands. Hence an aquarium with abundant water sources is the basic requirement for learning and doing research in the department of Aquatic Biology and Fisheries. Consequent on acquisition of the land by the Indian Air Force, the department which was formerly functioning at Shangumugham beach with a full fledged aquarium was shifted (1990) to the Kariavattom Campus of the University where there were no natural water sources. The efforts made by the department to create water sources to set up an aquarium in the campus were not fruitful since the ponds dug were not perennial. Students were conducting practical studies in the laboratories attached to the classrooms. Though a building donated (2006) to the University by the District Panchayat at an ideal locality (Akkulam, near Veli lake) for setting up an aquarium-cum-field station was renovated by the University at a cost of ₹ 11.25 lakh, funds for setting up the aquarium were not provided so far (October 2010). The department was functioning without an aquarium for the last 20 years.

Thus lack of proper vision on the part of the University to foresee the requirements of the department which was fully dependent on water bound

²³ PG Diploma in Functional Hindi, PG Diploma in Taxation Management and Certificate course in Communicative Arabic

²⁴ PG certificate course in Geriatric Care and Management and PG Diploma in Intellectual Property Rights

surroundings and to identify an ideal site to construct the department building with such facilities resulted in denial of sufficient field experience for PG students and research scholars. The department was now conducting practicals in a virtual environment. The Head of the Department has confirmed (May 2010) the audit observations. In the exit meeting the Registrar stated that action would be taken to set up an aquarium and field station in the building at Akkulam.

(ii) Disposal of radioactive waste by Bio-chemistry department

As per instructions of the Atomic Energy Regulatory Board (AERB), radioactive waste disposal pits are to be fenced off to prevent unauthorized entry. In the Biochemistry department, radioactive wastes were disposed off in two pits constructed in the backyard of the department, one for solid waste and the other for liquid waste without any fencing of the pits. The University needed to strictly follow the guidelines of AERB in disposing of radioactive wastes in order to safeguard the persons and environment. The Head of the Department stated (July 2010) that the pit would be fenced. In the exit meeting, the Principal Secretary to Government termed the issue as a very serious one and instructed university authorities to take remedial action.

(iii) Department of Bio-technology



Library books stored near the main switch board

Equipments stored in the corridors near the bathroom



As the department of bio-technology was too congested to accommodate classrooms and laboratories, six rooms of the chemistry department were also occupied by it. The books purchased for the library were kept near the main switch board as there was no space available for accommodating the library. The equipment purchased by the department was stored in the corridors near the bathroom. Lack of adequate space affected proper utilisation of library facility. The audit observations were confirmed by the Head of the Department.

(iv) *Oriental Research Institute and Manuscript Library*



Oriental Research Institute Library at
Kariyavattom



Manuscripts stacked in open wooden rack

**Palm leaf manuscripts
were not preserved as
per guidelines of
INTACH**

The Manuscript Library functioning under the department has more than 65,000 manuscripts most of which are palm leaves. These invaluable assets have to be preserved scientifically to avoid extinction. The Indian National Trust for Art and Culture Heritage (INTACH) has issued guidelines for preservation of manuscripts such as maintenance of constant room temperature and relative humidity, wrapping of manuscripts in de-starched cotton clothes and keeping them in closed wooden boxes, painting the room with zinc oxide or titanium dioxide to absorb ultraviolet rays, installation of dry-type fire extinguishers for fire safety, etc. Audit scrutiny revealed the following instances of non-compliance with guidelines in preservation of these invaluable assets.

- The method adopted for preservation of manuscripts was dusting, cleaning and oiling with citronella oil rotationally. As against the sanctioned posts of four oiling assistants, only two assistants on contract basis were in place from April 2008. Since the pace of oiling was too slow it would take years to complete one round of oiling.
- Only the rarest manuscripts were kept in closed boxes but were not covered with de-starched cotton cloth. Many palm leaves were found to have broken edges due to insect attack and brittleness.
- Air-conditioners provided in the room were not functioning for the last 20 years.

The University has to take urgent steps to protect the invaluable manuscripts from extinction, failing which, it will be an irreparable loss to future generations. The Head of Department confirmed (August 2010) the audit observations. The Principal Secretary to Government, in the exit meeting, urged the Registrar to take immediate action to preserve the manuscripts.

1.2.8.4 Grant of affiliation to colleges

According to Chapter 24 of the University Statute, the Syndicate is empowered to grant affiliation to any institution within the territorial jurisdiction of the University, provided the institution satisfies the conditions

prescribed in the laws of the University. It is mandatory for the University to ensure quality in education and verify the capability of the colleges in all respects on a year to year basis. The University issued provisional affiliation to 93²⁵ colleges and permanent affiliation to two²⁶ colleges during 2005-2009. A test-check of files relating to 33 self-financing colleges revealed non-observance of statutory provisions in five colleges, resulting in irregular grant of provisional affiliation, the details of which are given in **Appendix II**.

Inspections conducted by the University in 21 (out of 59) Teacher Education Colleges during 2009 revealed lack of facilities in 18 colleges. The details are given in **Appendix III**.

No periodical inspections of self-financing colleges were conducted after the first inspection to grant provisional affiliation

Provisional affiliation is granted after inspection by the University to self-financing colleges on their inception for the first academic year alone. Audit observed that subsequent inspections were being conducted only when additional courses were sanctioned, though statute insisted on periodical inspection. The Registrar stated that the inspections are being carried out in colleges periodically after granting affiliation; but no details were on record.

In the exit meeting, the Principal Secretary to Government observed that these institutions were only self-financing and not self-running as the University is conducting the examinations and should ensure the mandatory requirements.

1.2.8.5 Admission

Candidates who had not qualified in the entrance examination were admitted in six Engineering colleges

Students who were admitted to B. Tech courses in the State after qualifying in the entrance examinations conducted by the Commissioner of Entrance Examinations. A 'lateral entry' scheme approved by the Director of Technical Education provides for admission to meritorious diploma holders to the second year/third semester of the B.Tech course in 10 *per cent* additional seats sanctioned to enable them to obtain a degree in engineering. Students are selected under 'Lateral entry' scheme by conducting a State level Entrance Examination by the LBS²⁷ as per the directions of All India Council for Technical Education. The University should ensure that only qualified students are admitted for B.Tech Course. Audit scrutiny revealed the following irregularities in admission:

- (i) During 2008, 33 and 25 students admitted in Mary Matha College of Engineering and Technology, Thiruvananthapuram and Travancore Engineering College, Kollam respectively had not qualified in the entrance examination conducted by the Commissioner of Entrance Examinations. Similarly, during 2009, 96 students admitted in K R Gouri Amma College of Engineering, Alappuzha had also not qualified in the entrance examination conducted by the Commissioner of Entrance Examinations.
- (ii) During 2008, 29 students who did not qualify in the entrance examination conducted by LBS for the Lateral entry scheme were

²⁵ Self financing sector – 92, Government sector - 1

²⁶ Government Dental College, Thiruvananthapuram and Government Nursing college, Thiruvananthapuram

²⁷ Lal Bahadur Shastri Centre for Science and Technology

admitted in four self-financing engineering colleges and one aided engineering college²⁸.

The Controller of Examinations stated (September 2010) that the verification done by the Academic Sections of the University was limited to verifying whether the intake of students in a particular college was in conformity with the total sanctioned strength of a particular course. He added that the professional colleges themselves had to verify the prescribed qualification of the candidates at the time of admission. This indicated that there was no proper system in the University to ensure that unqualified students were not admitted in affiliated professional colleges. During the exit meeting, the Principal Secretary to Government directed the Registrar to formulate a system to check the admissibility of students at the time of admission itself.

**Enhancement of seats
against the decision of
Government**

Government had directed (August 2007) the University not to grant increase in intake in existing courses in the Government/aided sector. In violation of this direction, the Standing Committee of the University recommended (July 2009) enhancement of the total strength in B.Tech (Electronics and Telecommunications) to 60 seats from 50 in TKM College of Engineering, Kollam, considering their request. The University, however, communicated (July 2009) enhancement of seats from 50 to 90 to the Commissioner for Entrance Examinations, for making allotment for the year 2009-10. After allotment for the entire seats by the Entrance Commissioner, the mistake came to the notice of the University and it informed the correct position to the Government as well as to the Commissioner for Entrance Examinations. However, the college management filed a Writ petition before the High Court of Kerala, based on which the Government granted (August 2009) permission to operate the enhanced seats for the academic year 2009-10 alone. Without considering the above, the University allowed the college to continue admission in enhanced seats during 2010-11 also.

The Registrar stated (September 2010) that the enhancement of seats from 50 to 90 instead of from 50 to 60 was communicated to the Entrance Commissioner by oversight. In the exit meeting, the Registrar also admitted the failure of the University to intimate the Commissioner of Entrance Examinations about the Government's directions to restrict the admission to the year 2009-10 alone which resulted in admitting students for 30 more additional seats during 2010-11 also. No action was taken by the University against the erring officials.

1.2.8.6 Examinations

The University is entrusted with conducting examinations, declaration of results, etc., of its students. The University conducted 90 *per cent* of the examinations on scheduled dates during the review period and the results were declared on time. The University also constituted 'malpractices detection squads' for conducting free and fair examinations. The rate of detection increased considerably justifying the effectiveness of the squad.

²⁸ Mary Matha College of Engineering, PA Aziz College of Engineering, Travancore Engineering College, Younus College of Engineering and TKM College of Engineering.

Ineffective functioning of Scrutiny Boards to check question papers

According to the Examination Manual, the Controller of Examinations should constitute a Scrutiny Board to ensure that the questions are in conformity with the prescribed syllabus. During 2007-08 to 2009-10, complaints were received regarding 'out of syllabus' questions in 42 papers of different subjects. The BOS confirmed the out of syllabus questions in 33 papers and directed the Controller of Examinations to solve this issue by adopting different procedures, viz. liberalized valuation, awarding of 50 *per cent* marks for the out of syllabus questions, valuation of papers excluding the out of syllabus questions and then converting it for 100 marks, etc. Thus proper evaluation of the abilities of the students was not possible and good students might not have been benefited fully while weaker students might have been unduly benefited. The presence of out of syllabus questions in significant number of papers showed that the Scrutiny Boards were not functioning effectively.

The Controller of Examinations stated (August 2010) that question papers were set by persons from outside the State or external Universities and in the Examination Manual, there was no provision to take action against these erring persons. In the exit meeting, the Registrar stated that in order to maintain confidentiality, no further scrutiny was done on question papers received from question paper setters.

1.2.8.7 Valuation of answer scripts

Valuation of answer scripts is a very important activity, but audit scrutiny revealed the following deficiencies:

i) Delay in revaluation

According to chapter VI of the Kerala University First Ordinances, 1978 teachers with a minimum teaching experience of three years in a college or university could be posted as examiners. Audit observed that teachers of the University College of Engineering having less than one year teaching experience were also deputed as examiners, violating the norms. An analysis of the revaluation applications received during 2007-08 and 2008-09 revealed that:-

- Out of 5,183 applications received during 2007-08 and 2008-09 in respect of the final examinations of B.A, B.Sc, B.Com, MBBS, B.Tech and B.Arch courses increase in marks (up to 35 marks) were allowed in 2,927 cases (56 *per cent*).
- Out of 200 revaluation cases test-checked in audit, changes in final marks were awarded in 118 cases (59 *per cent*). The addition in mark was above 20 in 12 cases, above 15 in 10 cases and above 10 in 22 cases.

As the changes in marks on revaluation on the basis of applications received from students was more than 50 *per cent*, chances of change in marks on those who had not applied for revaluation due to various reasons could not be ruled out.

Changes in final marks on revaluation ranged between 56 and 59 per cent in test-checked cases

There were delays of 95 to 328 days in completing revaluation of answer scripts during 2007-2009

According to the examination manual revaluation of answer scripts was to be completed within 60 days from the last date of receipt of applications for revaluation which was subsequently reduced to 45 days as per the decision (March 2007) of the Syndicate. Section 80 of the Kerala University Act, 1974 also stipulates forfeiture of two months' pay and allowances of teachers who refuse to do examination duties. Audit noticed a delay of 95 to 328 days for completing the process during 2007-2009. Out of 801 teachers called for revaluation during 2007-08 and 2008-09, only 483 teachers turned up. The revaluation of answer scripts of B.Arch and B.Tech was pending since 2007 and 2008 respectively. This would affect the careers of students who wished to pursue higher studies. No action was taken as per the provisions of Section 80 of the Act against the defaulting teachers. On the other hand, the University paid compensation of ` one lakh in one case and ` 0.30 lakh in four cases due to delay in revaluation of answer scripts, consequent on award of compensation by the Lok Ayukta and sub-courts.

Slackness on the part of the University in appointing qualified examiners for valuation of answer scripts and non-enforcement of provisions of the examination manual and the University Act in respect of delays in revaluation of answer scripts, created hardship for the students. In the exit meeting, the Principal Secretary to Government urged the Registrar to invoke penal provisions.

(ii) Missing answer books

Inefficiency in handling answer book led to loss of answer books

As per the guidelines for revaluation, in the event of the examiner's failure to return the answer books to the University, he/she should be permanently debarred from the University as an examiner and a fine of ` 5,000 per missing/damaged paper should be imposed on him/her in addition to making him/her liable to pay compensation, if any, as ordered by the court or the competent authority. Scrutiny of the minutes of the Standing Committee on examinations revealed that eight²⁹ answer books in respect of examinations held during 2002 to 2008 were missing. In the above eight cases, legal action was initiated in one case against the examiner on the basis of a complaint filed by a student. The Controller of Examinations stated that special examinations were conducted in six cases and no action could be taken in one case as the period of the event was too old.

Further, 84 answer scripts bearing false numbers from 55355 to 55438 of part I section B of Community Medicine of the third year MBBS Examination held in June/July 2004 were missing. The examiner had testified that the answer papers had been handed over to the University and acknowledgement had been received. The answer scripts of 15 candidates, who had applied for revaluation, were among the 84 missing answer scripts. The Syndicate decided (March 2007) to give the students a chance to reappear for the papers in the same syllabus without remitting examination fees. The missing answer scripts had not been traced out even after six years. No penal action was initiated against the persons responsible.

The Controller of Examinations contended that there were practical difficulties in debarring the examiners permanently from examinership because the

²⁹ 2002 : 2, 2005 : 3, 2006,2007 and 2008 : one each

University would lose their valuable services and in cases where answer books were not retrievable another opportunity was given to the candidates to write examinations in the same scheme without charging examination fees. This showed that the University was not taking punitive measures to prevent occurrence of such events.

In the exit meeting the Principal Secretary to Government directed the University to invoke the penal clause.

(iii) Inordinate delay in preparation of rank lists

Delays in finalisation of rank lists would adversely affect students in their claims for post graduate merit scholarships of UGC, pursuance of higher studies as well as their job prospects. Audit observed abnormal delays in preparation of rank lists in certain cases due to delays in completion of the revaluation process as detailed in **Appendix IV**. Rank lists for B.Com and B.Arch had been prepared up to 2006, for B.Sc up to 2007 and for B.Tech and MBBS up to 2008.

(iv) Deficiency in application software in Examination Wing

The University Computer Centre had developed an application software, called System for Automated Governance of Examination (SAGE), for the examination wing to automate the examination activities starting from tabulation work to the issuance of certificates. Work relating to B.Tech, P.G. and L.L.B. courses had been automated. Passwords were assigned by the Computer Centre to all operators with hierarchical access to different modules. Scrutiny of SAGE revealed the following deficiencies:

- (a) Though only the Controller of Examinations was authorized to keep all the records relating to examinations, the data base containing confidential data was under the control of the computer centre since 2002. The control on confidentiality and integrity of data was insufficient as contract programmers were engaged in the computer centre.
- (b) Administrative privileges were not given to the examination wing which created unnecessary delays in processing, making the whole process cumbersome. It was replied (August 2010) by the Controller of Examinations that due to non-availability of a suitable person, the administrative privileges were not taken over by the Examination wing.
- (c) The system was not capable of handling more than four users at a time due to a low capacity server. One high end server purchased (March 2010) was not installed as of August 2010 due to change in specifications.

The Controller of Examinations stated (August 2010) that a detailed note indicating the various flaws and drawbacks such as difficulties in initial registration of candidates, marking of lateral entry, issuing/suspending user-ids to the staff, uploading/downloading of online registration data, restoration/backing up of data, etc., was submitted to the computer centre for immediate rectification. In the exit meeting the Principal Secretary to Government observed that the database and software should be under the

control of the examination wing and directed the Registrar to take urgent steps to protect the software from external interference and manipulation.

1.2.9 Research Activities

Research activities in the University are centered around M.Phil, Ph.D and sponsored research projects funded by UGC/Government of India and other State/Central Government Agencies. Facilities for research activities are available in all Departments/Centres for students pursuing their Ph.D degree. The University staff/research scholars have won several honours and fellowships in the field of research. During 2004-09, 1989 students registered for Ph.D under various departments/centres of the University/affiliated colleges. As of March 2010, Ph.D degrees were awarded to 709 research scholars.

1.2.9.1 Discontinuance of research work by Research fellows enjoying fellowships

Discontinuance of fellowships against the provisions of University ordinance

As per the Kerala University First Ordinances, 1978, a Research fellow should not resign his appointment during the tenure of his fellowship or discontinue research work without obtaining the permission of the Syndicate, or else, the holder would have to refund the whole amount of the fellowship received by him or any portion thereof or the Syndicate may waive the recovery of the amount in such cases. In contradiction of the above provisions, 38 research fellows enjoying Junior Research Fellowships/Senior Research Fellowships/Post-doctoral Fellowships had quit research work during 2005 to 2009 with the permission of the Vice-Chancellor. The University should insist on execution of an undertaking or bond by the candidates to discourage research fellows from discontinuing research work. In the exit meeting, the Principal Secretary to Government directed the Registrar to insist on execution of undertaking or bond by research fellows.

1.2.9.2 Sponsored research projects

The academic departments and centres carried out research projects sponsored by UGC/Government of India/Kerala State Council for Science Technology/International Agencies. The status of projects sanctioned during 2004-05 to 2009-10 is shown in the **Table 1.7**.

Table 1.7: Status of sponsored research projects

(` in crore)

Funding Agency	No. of Projects sanctioned	Total fund sanctioned	Fund released	Status of Projects		
				Completed	Ongoing	Pending
UGC	38	2.08	1.52	1	37	Nil
Central/State Government Agencies	63	7.70	5.77	17	43	3
Projects from international agencies	3	0.34	0.34	1	2	Nil
Total	104	10.12	7.63	19	82	3

Source : Details furnished by the University

- The period of completion of most of the above projects was one to three years. Out of the ongoing 82 projects, 18 projects were to be completed by 2009. Five projects involving ` 38.87 lakh sanctioned prior to 2004-05 were still to be completed.

**Ineffective utilisation
of funds sanctioned for
research projects**

- As per details furnished to Audit, utilisation certificates for ` 30.24 lakh in respect of seven projects had not been submitted to the funding agencies, details of which are given in **Appendix V**.
- The Head of the Department of Aquatic Biology department had received ` 40.23 lakh during 2000-2005 for five projects to be completed by March 2009. He retired from service on superannuation on 30 April 2008 without completing any of the projects. The Registrar stated that he had submitted utilization certificates for the funds received except for ` 3.79 lakh and he had been directed to submit the pending utilization certificates and statement of expenditure. The reply cannot be accepted as mere utilization of funds without submitting final research findings would have defeated the objectives for which the funds were released.

Lack of monitoring by the University was the main reason for the lapse on the part of Principal Investigators.

1.2.9.3 Generation of patents

As per the Kerala University First Ordinances 1978, the Syndicate was competent to take out patents in respect of any discovery or invention made by the teachers or research students working in the University. However, the University had not paid any attention to encourage teachers and research fellows in this regard in the past. This resulted in non-generation of patents for any of the research findings till 2009. The University had not constituted a Research Development Committee of experts to scrutinize the project proposals submitted by Principal Investigators. The University had neither maintained a centralized record of its achievements in research activities nor prepared any data on the success rate of research projects, patents obtained, etc. of other universities for its evaluation.

In August 2009, the University constituted an Intellectual Property Right Cell (IP Cell) to promote IP generation in the University with financial assistance from the Kerala State Council for Science, Technology and Environment. One patent (Biochemistry) was granted in the name of the University after the formation of the IP Cell. Besides, the Cell had applied for one patent from the Centre for Bioinformatics and five patents from affiliated engineering colleges. The Registrar stated (June 2010) that steps were being taken to constitute a Research Development Committee of experts to screen the proposals of Principal Investigators to monitor the progress of projects and to ensure whether the projects would be beneficial to the public.

1.2.10 Human Resource Management

Effective human resource management is essential for academic growth and overall development of the University. The Academic Staff College of the University was ranked first among all the Universities by UGC on the basis of programmes conducted and participation during the Tenth and Eleventh Plan periods. However, audit noticed non-filling up of many regular teaching/non-teaching staff as discussed in succeeding paragraphs:

1.2.10.1 Appointment of teachers

The University is bound to offer quality education to students by appointing qualified teachers on regular basis. Academic growth of educational

institutions depends on the strength of teaching staff. Shortage of teaching staff would result in reduction of teaching hours leading to non-coverage of course contents satisfactorily. This would adversely affect the rating of the University by Central Bodies like National Assessment and Accreditation Council and UGC.

Shortage of teaching staff in six departments ranged between 50 and 80 per cent

- (i) The staff strength in the Academic Departments was fixed by the University based on UGC norms considering the number of working days, the minimum number of teaching hours in a calendar year and the number of batches sanctioned. Audit observed that against 254 regular teaching staff sanctioned for 40 academic departments, only 155 regular teachers (61 *per cent*) were available as of March 2010. Taking into account the 18 contract teachers also, the total staff strength would be only 68 *per cent* of the sanctioned strength. In six³⁰ departments, the shortage ranged between 50 and 80 *per cent*. In the exit meeting, the Registrar stated that non-filling up of vacant posts was due to the ban imposed by Government. However, the Principal Secretary to Government stated that the ban was only for creation of new posts and urged the Registrar to initiate the recruitment process to fill up the regular vacancies.
- (ii) Approval of the All India Council for Technical Education (AICTE) is required for running engineering colleges subject to satisfactory compliance of its norms with regard to infrastructure/instructional facilities. Permission to continue the B.Tech Courses in the College of Engineering run by the University on self-financing mode was being granted by AICTE since 2000-01 on a year to year basis subject to appointment of Principal having a Ph.D degree and 36 regular teaching staff on full scale of pay. AICTE norms also stipulated that the selection of faculty was to be made by a selection committee having representation from the State Government, University and AICTE. No selection committee had been constituted (October 2010). Against the norms, 28 to 29 teachers were appointed on contract basis through walk-in-interviews during the audit period.

1.2.10.2 Shortage of University Assistants

There were only 404 Assistants (52 *per cent*) in the University as of March 2010 against the sanctioned strength (March 2006) of 783. Though the University appointed 180 Assistants from the rank list published on 8 April 2008, further appointments from the list were stayed by the High Court following allegations regarding the genuineness of the rank list prepared by the University. In order to overcome the shortage, University appointed 336 Desk Top Publishing (DTP) operators on daily wages. Audit noticed that many of these temporary DTP operators were also posted in confidential sections in the examination wing. This was not desirable since the service rules were not binding on them and the temporary nature of engagement could also affect the quality of work. The University may consider re-fixation of staff strength in the light of advancement in technologies. In the exit meeting, the Principal Secretary to Government agreed to this suggestion.

Shortage of assistants was 48 per cent as of March 2010

³⁰ Archeology, Future Studies, Malayalam, Opto-electronics, Russian and Tamil

1.2.10.3 University Computer Centre

A full fledged computer centre was established in the late seventies in the University to develop various types of software required for the computerisation of departments under the University. After the retirement of regular programmers appointed during the eighties, only the Director, Technical Officer and a DEO were in position as on date. Programmers were appointed on contract basis and an average of six persons quit every year for better prospects, after acquiring experience even before completing the period of contract. No penalty clause was included in the contract. Frequent change of programmers had adversely affected the continuity of the programming work. Due to non-filling of regular staff, the University could not effectively utilize the expertise of the computer centre. It could develop only four³¹ types of software during the period 2004-10, despite spending ` 1.97 crore during 2004-2009. In the exit meeting the Registrar stated that vacancies of System Programmers had been notified. The Principal Secretary to Government agreed to consider outsourcing of the software development, keeping in view the heavy expenditure the University was incurring for this.

1.2.11 Administrative matters

1.2.11.1 Annual Report

As per Section 49 of the Kerala University Act, the University has to prepare an annual report under the direction of the Syndicate and the report should be placed before the State Legislature. Annual reports up to 2009 were completed and reports up to 2008 were submitted to the State Legislature. The Annual report for the period of audit reflected the academic, research and development activities of the University, but it did not cover the activities and achievements of the Institute of Distance Education and the engineering college run by the University. The sanctioned strength and men-in-position of the non-academic staff were also not included in the reports. The Registrar agreed (July 2010) to rectify the lapses in subsequent annual reports.

1.2.11.2 Re-accreditation of the University by NAAC

The National Assessment and Accreditation Council (NAAC) gave accreditation to the University with B++ grade for a period of five years which ended on March 20, 2008. The process for re-accreditation was to commence before the expiry of the accreditation. The University was to send a letter of intent to NAAC and fulfill minimum institutional requirements which included the establishment of an Internal Quality Assurance Cell (IQAC), submission of Annual Quality Assurance Reports and Self Study Reports. Audit observed that though IQAC was constituted in May 2005, the letter of intent for re-accreditation was sent only in March 2009 along with Annual Quality Assurance Reports for the years 2003-04 to 2007-08, after one year from the expiry of the original accreditation. The self study report had not yet been submitted. Delay in initiating action for accreditation would naturally delay the re-accreditation process. The Registrar stated (July 2010) that the self study report was at the finishing stage and would be submitted to NAAC at the earliest. The same had however, not been submitted as of October 2010.

³¹ software cash counter, system for automated governance of examination, semi-automated system for examination, system for web enabled examination transactions

1.2.12 Estate Management and Support Services

The University owns 403.94 acres of land consisting of the Senate House campus, the Kariyavattom campus, the University stadium, the women's hostel, the University press, the University library, Students Centre, Observatory, Study centres, Aquarium, etc. Audit observed deficiencies in management of assets by the above entities as detailed below:

1.2.12.1 Modernisation of University Library

Modernisation of the University library was taken up (March 2007) at a cost of ₹ three crore. As part of modernization, 42 computers for ₹ 12.12 lakh were purchased (December 2008) out of which 27 computers for ₹ 7.79 lakh were not installed (August 2010) for want of infrastructure facilities. In the exit meeting, the Registrar stated that automation process was going on. If installation of computers was unduly delayed, the warranty would expire.



Monitors of the 27 idling computers

The High Power Committee constituted for Quality Improvement through information technology recommended (February 2001) digitalisation and networking of the Central library with the library at the Kariavattom campus and various departmental libraries to enable participation in the UGC network subsequently. Though, some of the libraries including the main library were computerized, networking of the main library with the library at Kariavattom campus and with other departmental libraries had not been done so far. The University Librarian-in-charge admitted (August 2010) lack of co-ordination between the main library and department libraries in functional activities. Resource sharing and co-operation among these libraries were also not operational.

1.2.12.2 Engineering Wing

The engineering wing did not maintain basic records such as asset register, work register and standard measurement books. There was no mechanism to check the quality of the construction. Technical sanction was not accorded for any of the works executed. The University Engineer stated (April 2010) that in future, a formal technical sanction would be issued to all the works. The estimates were prepared without conducting proper land surveys which resulted in change of site in two works namely 'construction of building for Centre for Bioinformatics' and 'construction of building for Aquatic Biology and Fisheries'. Post-contractual changes led to extra expenditure of ₹ 43.70 lakh. The University Engineer had attributed (April 2010) the additional expenditure to revision of plan and estimate and for providing extra facilities.

Works were arranged without depositing adequate funds with the Central PWD which resulted in non-completion of two works viz. 'construction of a two-storied building for competency training centre' and 'construction of ground floor of a guest house for the Academic Staff College which should have been completed by August 2009 and April 2010 respectively. The

University Engineer stated (April 2010) that the University had not sanctioned additional funds. Arrangement of works without depositing adequate funds was against financial propriety.

1.2.12.3 Estate Wing

- As required under paragraph 8 of chapter 41 of Kerala University First Statutes, 1977, the asset register showing the values and plans of all buildings and immovable assets owned by the University was not maintained.
- The University was not equipped with effective fire fighting devices. Though a number of fire extinguishers were installed in the buildings, these were not periodically tested/serviced. Fire-exits were not provided in most of the buildings. Security staff were not trained in fire fighting.

1.2.13 Internal control

1.2.13.1 Internal Audit

The University constituted an Internal Audit wing under the Finance Officer consisting of a Deputy Registrar, two Assistant Registrars, three Section Officers and three Assistants. In addition, there is a salary audit wing for audit of salary bills. The audit plans were not chalked out in advance and the departments were selected at random. No training was imparted to the audit staff. No detailed audit was being conducted, by internal audit wing and only special audit was being conducted whenever complaints on financial irregularities were received, in order to fix responsibility. An internal audit manual has not been brought out. Audit of the administrative, planning and academic branches had not been conducted so far. Scrutiny of the details of internal audit conducted from 2005-06 onwards revealed that 27 out of 40 academic departments under the University had not been subjected to internal audit as of July 2010. Supporting departments such as University Library, University press, Computer Centre, Publication Division, etc., had also not been audited so far.

1.2.13.2 Physical verification of stock

Annual physical verification of library books should be conducted to locate the missing books, if any, and to make good the loss. The Kerala University Central Library, established in the year 1942 is the oldest University Library in the State having a collection of more than three lakh books. The campus library at Kariyavattom and those under the various teaching departments and centres come under the Central Library. Physical verification of the stock of books in the Central Library was last conducted in 1987. A random verification of stock in March 2010 with 186 accession numbers by the Librarian revealed that 38 books (20 per cent) were missing. The result of the sample verification had neither been reported to the University nor had any action been initiated to conduct verification of a sizable sample to represent a justifiable number. It was also noticed in audit that a good number of old books kept along the ventilation grills/veranda were soiled. Weeding out of old/unusable books had not been done so far. Due to non-conducting of physical verification, the possibility of loss/theft of valuable and resourceful books purchased since inception of the library cannot be ruled out.

Internal audit of 27 (out of 40) academic departments was not conducted from 2005-06

Physical verification of library books in the Central library was not conducted after 1987

The University Librarian (in-charge) replied (August 2010) that the collection of the bound volumes of journals were kept in the veranda temporarily since modernization work was going on in the library for the last one and a half years and this would be removed soon for digitalization and proposals for weeding out of outdated materials were pending with the University.

1.2.14 Conclusion

Annual Action Plans except for plans related to the conduct of examinations were not being prepared by the University. The Non-Plan grant given by the Government was not commensurate with the increase in Non-Plan expenditure during 2007-08 and 2008-09. Deductions made from the employees towards provident fund were not remitted to the University Provident Fund account during 1990-95, which resulted in a huge deficit in the provident fund accumulations of the employees. No pension fund was constituted by the University to meet the pension liabilities. Innovative courses introduced with assistance from UGC did not elicit good response from students. The Scrutiny Boards constituted for checking the question papers were not functioning effectively. There were delays in completion of revaluation of answer scripts and changes in final marks on revaluation ranged between 56 and 59 *per cent* in test-checked cases. There were delays in completion of research projects, non-submission of research findings and non-submission of utilisation certificates on time. Research fellows enjoying fellowships discontinued research without the permission of the Syndicate. Shortage of teaching staff and lack of infrastructure in academic departments, non-observation of statutory provisions in granting affiliation to colleges and shortage of Assistants in the University were noticed. Internal audit was in arrears.

1.2.15 Recommendation

- The University should prepare comprehensive Annual Action Plans including all its activities.
- Government may consider enhancing Non-Plan grants to the University to meet the increased liabilities in salaries and pension due to pay revision.
- The University should take effective steps to attract students for innovative courses by giving wide publicity, providing regular teaching staff and restructuring of the courses, if necessary.
- The University should ensure that the colleges satisfy the mandatory requirements for affiliation.
- The University should ensure that the qualification criteria for admissions to various courses are enforced.
- Examination duty should be made mandatory and penal action should be taken against erring examiners.
- The University should consider filling up the vacant posts of teaching staff to reduce the acute shortage of teachers in academic departments.
- The University should take immediate steps to strengthen its Internal Audit wing.

The above points were referred to Government in September 2010, reply had not been received (November 2010).

WATER RESOURCES DEPARTMENT

1.3 Kerala Water Supply Project

Highlights

The Kerala Water Supply Project, assisted by the Japan International Co-operation Agency is aimed at augmenting and rehabilitating the existing water supply systems in two urban regions and providing comprehensive water supply to three rural regions of the State. The project, proposed to be started in February 1997, was started only in September 2003 due to delays in appointment of consultants. Consequently, the period of completion was revised to August 2009 and later extended to December 2010. A review of the implementation of the project revealed defective preparation of the designs and the estimates, large scale execution of excess quantities and extra items, execution of road works not associated with the scheme, etc. The Thiruvananthapuram Water Treatment Plant which was part of the project was partially commissioned in May 2010.

A defective survey led to preparation of unrealistic estimates which resulted in execution of excess quantities and extra items of work.

(Paragraph 1.3.6.1)

The annual budget estimates from 2005-2006 to 2009-10 far exceeded the actual expenditure.

(Paragraph 1.3.7.1)

Delays in execution of the project resulted in time over-run of 13 years from the date of execution of the first agreement for the loan assistance and cost over-run of ` 1199.95 crore.

(Paragraph 1.3.7.3)

Storage capacity of the source of the Thiruvananthapuram scheme could not be increased due to the non-receipt of clearance from the Ministry of Environment and Forests.

(Paragraph 1.3.8.3)

Central excise duty exemption amounting to ` 4.28 crore and ` 2.04 crore in respect of the Thiruvananthapuram and Cherthala Schemes respectively was not recovered from contractors by the Kerala Water Authority.

(Paragraph 1.3.9)

Expenditure of ` 3.60 crore was noticed in the Thiruvananthapuram scheme due to enhancement of ceiling limit of price adjustment from 10 to 20 per cent by the State Government.

(Paragraph 1.3.10)

Liquidated damages for delays in completion of scheme packages, amounting to ` 22.58 crore, had not been levied and recovered in the Thiruvananthapuram, Cherthala and Pattuvam schemes.

(Paragraph 1.3.12)

1.3.1 Introduction

The Kerala Water Supply Project (KWSP) assisted by the Japan International Co-operation Agency (JICA)³² aimed to augment and rehabilitate the existing water supply schemes in two urban regions³³ and to provide comprehensive piped water supply in three rural regions³⁴. The project was to be implemented in two phases. The first phase taken up for execution was intended to benefit a population of 33.91 lakh in 2006 and a projected population of 37.82 lakh in 2021. The second phase is intended to benefit a population of 40.82 lakh in 2036. Though the existing water supply schemes for Kozhikode and Thiruvananthapuram urban areas had been augmented over the years, adequate attention was not paid for the rehabilitation, maintenance and upgradation of these schemes. There existed only small water supply schemes in the rural regions which benefited only a small portion of the population. The existing sources of water in the rural regions were bore wells and surface water. The water sources in Cherthala and Pattuvam areas were saline and proper treatment facilities were not in existence. The Pattuvam area was also prone to drought. The project proposed to be started in February 1997 with stipulated time of completion of December 2003 could be started only in September 2003 mainly due to delay in appointment of consultants as a result of the allegations regarding short listing the consultants and related court cases. Consequently the period of completion was revised to August 2009 and further extended to December 2010.

1.3.2 Organizational set-up

The Kerala Water Authority (KWA), an autonomous body under the Water Resources Department is the implementing agency of water supply schemes in the State. The Chief Engineer is the head of the JICA project implementation team assisted by Project Managers. The consultants were appointed by KWA for the preparation of detailed engineering design, pre-construction engineering services, construction engineering services, supervision services and training.

1.3.3 Audit Objectives

The objectives of the performance audit were to assess whether:

- Ø the designs, estimates and bid documents were based on detailed investigation and planning;
- Ø the financial management was efficient, economic and effective;
- Ø the project was implemented in an efficient and economic manner and
- Ø the project was monitored properly.

1.3.4 Audit Criteria

The following audit criteria were adopted:

- Ø Standards prescribed in detailed study report, project appraisal

³² Earlier known as Overseas Economic Co-operation Fund (October 1999)/Japan Bank for International Co-operation (October 2008).

³³ Kozhikode and Thiruvananthapuram.

³⁴ Cherthala and adjoining villages (Alappuzha District), Meenad and adjoining villages (Kollam District) and Pattuvam and adjoining villages (Kannur District).

documents, minutes of decisions, loan agreements, contract agreements, orders of the Government of India and the State Government, revised project proposals and estimates.

- Ø Guidelines and procedures of the State Government and JICA for implementation of schemes and contract management.
- Ø Financial rules and orders and budget documents.
- Ø Project implementation plan.

1.3.5 Scope and Methodology of Audit

The performance audit, covering the period of execution from September 2003 up to March 2010, was conducted during April-August 2010 by test check of the records in the Water Resources Department (WRD) and the JICA Project office of the KWA. A centralised system of accounting is followed for the project and the sample selection was based on physical and financial achievements. One urban water supply scheme (Thiruvananthapuram) and two rural water supply schemes (Cherthala and Pattuvam) were selected for review. Site visits were conducted in the presence of Project Managers. An entry meeting with the Secretary, Water Resources Department was conducted in June 2010 wherein the objectives and criteria were discussed. An exit conference was conducted with the Special Secretary, Water Resources Department in October 2010 wherein the audit findings and recommendations were discussed in detail.

Audit findings

1.3.6 Project formulation and Planning

According to the guidelines of JICA, appointment of an international consultant by the KWA was mandatory. The consultant had to carry out the designated works such as investigation and planning, design, preparation of estimates, tendering and awarding the work, supervising the work, quality control, taking measurements and furnishing the bills of works. KWA appointed (June 2003) Tokyo Engineering Consultants Consortium comprising five³⁵ separate consultancy firms as consultant of the project.

The components of each water supply scheme were divided into five packages. The components and number of contracts under each package were as detailed in **Table 1.8**:

Table 1.8: Details of work included under each Package

No. of Package	Category of contracts	Components of packages	Number of contracts
1	ICB	Intake well, Raw Water Main and Water Treatment Plant.	5
2	ICB	Laying Transmission mains ³⁶	6
3	LCB	Distribution system	5
4	LCB	Reservoirs.	5
5	LCB	Rehabilitation of existing schemes.	2
Total			23

ICB- International Competitive Bid. LCB- Local Competitive Bid.
Source- Project Review Report.

³⁵ 1)Tokyo Engineering Consultants Company, Tokyo (lead consultant). 2) Binni Black & Veatch of Great Britain. 3) GKW of Germany. 4) Shah Technical Consultants, Mumbai. 5) Centre for Environment Development, Thiruvananthapuram.

³⁶ Laying transmission main at Kozhikode was divided in to two reaches considering its length.

All the packages except package-5 were taken up for execution from April 2006 onwards.

1.3.6.1 Defective survey

A defective survey led to preparation of unrealistic estimates

The survey work which formed part of the investigation and planning for the project consisted of topographical and geotechnical surveys. The consultant commenced survey work in January 2004. The topographical survey was intended to collect the information regarding the existing and proposed reservoir sites in the towns, cities, villages, the distribution systems, road/street/lane names, names of location of the various zones, areas, wards, places of worship/prayer, public gardens, schools, hospitals, industries, public toilets/taps and the habitations on both sides of roads/streets/lanes. Audit observed that the topographical survey of the Thiruvananthapuram scheme was incomplete. In the survey data of the Cherthala scheme, most of the junction names and road names were not marked in the drawings. The location of distribution lines was not included in the survey data of the Pattuvam scheme. The defects pointed out by KWA were not rectified before preparing the designs of the distribution system of these schemes in May 2006.

The geotechnical survey consisted of soil investigation and analysis of soil properties based on which designs were to be prepared. Audit observed that the geotechnical survey conducted by the consultant for the reservoir site of the Cherthala scheme was faulty. The soil investigation was again conducted by the consultant through the College of Engineering, Thiruvananthapuram and the designs were modified after awarding the work but before commencement of execution. Designs for foundations of a hostel building in Thiruvananthapuram and reservoirs in Pattuvam were also changed during execution, due to faulty soil investigation.

The Chief Engineer (CE), of the project, stated (September 2010) that the topographical survey report of Thiruvananthapuram scheme was not finalised pending rectification of defects. The deficiencies in the surveys of the other two selected schemes were rectified.

The defective survey led to preparation of unrealistic estimates which resulted in execution of excess quantities and extra items of work and non-completion of works within the time frame fixed as detailed in paragraph 1.3.8.4.

1.3.7 Financial management

1.3.7.1 Funding pattern

Government of India (GOI) signed (January 1997) a Memorandum of Understanding (MoU) with the Government of Japan for the loan assistance. The project originally estimated to cost ₹ 1787.45 crore in 1997 was revised to ₹ 2987.40 crore in 2008. The estimate was inclusive of the cost of land acquisition, administrative expenditure and taxes which were not eligible for loan assistance. The loan was sanctioned in tranches based on agreements signed between GOI and the JICA as shown in **Table 1.9**.

Table 1.9: Details of loan agreements executed with JICA

Tranche No. (Instalment)	Loan Agreement no.	Date of Agreement	Amount (₹ in crore)	Due date of closure
Tranche I	ID-P 123	25-2-1997	460.00	03-06-2008
Tranche II	ID-P 184	30-3-2007	1303.30	11-07-2012
Tranche III	ID-P 203	31-3-2009	636.35	28-07-2013
Tranche IV	*	*	265.05	*

*Loan agreement not signed as of October 2010.

Source- Loan agreements.

JICA funded the project by way of reimbursement of expenditure initially incurred by KWA out of the annual allocation for the project received from the State Government. Up to 2004-05, the State Government provided funds to KWA in the form of grants. From 2005-06 onwards, the State Government released funds to KWA as loans. The budget estimate of KWA, funds released by State Government and expenditure up to March 2010 were as detailed in **Table 1.10:**

Table 1.10: Statement of Expenditure

(₹ in crore)

Year	Budget Estimate of KWA	Loan released by State Government	Total Expenditure	Expenditure break-up	
				JICA share (Loan portion)	KWA share
2003-04	20.00	...	9.70	9.54	0.16
2004-05	40.00	20.21*	20.84	8.24	12.60
2005-06	440.00	89.04	13.70	8.72	4.98
2006-07	650.00	144.84	188.34	166.75	21.59
2007-08	800.00	662.18	481.80	431.88	36.95
2008-09	800.00	379.00	495.37	469.23	24.45
2009-10	900.00	324.27	315.60	281.17	20.02
Total	3650.00	1619.54	1525.35	1375.53	120.75

* Grant during 2004-05

Source- Statement furnished by the KWA and accounts maintained by AG (A&E) Kerala.

The annual budget estimates were less than the actual expenditure due to gap between forecast and performance

The expenditure incurred during 2003-04 and 2004-05 was for payment of consultancy charges. The annual budget estimate of KWA for the project from 2005-06 onwards was far more than the expenditure. It was observed in audit that the budget allocation was prepared based on the balance of loan to be received from the JICA and as per the annual disbursement forecast of KWA. However, the State Government released funds according to the requests from KWA based on the requirement for payment to contractors. Hence, the actual fund requirement based on progress in execution was less than the anticipated requirement due to the gap between forecast and performance.

The expenditure break-up of loan and the KWA share do not match with the total expenditure from 2007-08 onwards. The difference of ₹ 29.07 crore from 2007-08 to 2009-10, had not been reconciled as of October 2010.

1.3.7.2 Extra liability due to non-drawal of loan

Extra liability of ₹ 39.16 lakh by way of commitment charges

The tranche III agreement for the loan amount of ₹ 636.35 crore was executed in March 2009. The conditions of loan included a new provision for payment of commitment charges at the rate of 0.1 per cent per annum on the unavailed portion of loan from the effectuation period of 120 days from the date of signing the agreement. The loan sanctioned in tranche I was utilised by June

2008 only and the unutilized portion of the loan sanctioned in tranche II was ₹ 622.26 crore as of March 2009. As a result, KWA could utilize only ₹ 15.81 crore of the tranche III loan up to March 2010. The first half-yearly instalment of commitment charges for the unavailed portion of the loan was payable on 20 April 2010. JICA debited (April 2010) ₹ 39.16 lakh from the loan account towards commitment charges.

KWA stated (September 2010) that the entire loan could not be got reimbursed within one year and there was a reduction in the interest rate of the loan by 0.1 per cent along with the inclusion of commitment charges in the agreement.

1.3.7.3 Time and cost over-run

The original estimated cost of the project was ₹ 1787.45 crore. The first loan agreement was executed in February 1997 and the works were due for completion by December 2003. However, KWA could not adhere to this time schedule due to the delay of six years in the appointment of the consultants and the project started only in September 2003. The process of investigation, planning and tender procedures took two and a half years thereafter and the works were started during April 2006 to February 2007. The period of completion of the works ranged between February 2008 and February 2009. None of the schemes were completed within the stipulated completion period and the overall progress of works as of March 2010 was 72 per cent against the targeted progress of 99 per cent. However, the Water Treatment Plant (WTP) of Thiruvananthapuram scheme was partially commissioned in May 2010. The non-completion of the project resulted in revision of the project cost to ₹ 2589.90 crore in November 2006 and to ₹ 2987.40 crore in November 2008 and the cost over-run was ₹ 1199.95 crore³⁷. The consultancy charges also increased from ₹ 102.10 crore to ₹ 112.20 crore due to the extension of the period of completion.

The Chief Engineer (CE) of the project stated (September 2010) that with lapse of time the original base year of 1991 became obsolete and was revised as 2006. Consequently, the design period was also revised from 2021 to 2036. To meet the increased water demand of the projected population in 2036, the scope of the project had to be revised. This contributed to a major portion of the cost increase in addition to the increase in cost due to the delays.

1.3.8 Implementation of the project

Implementation of the project commenced in September 2003. After the survey, investigation, preparation of designs and estimates, the works were tendered and awarded and execution started from April 2006 onwards. The deficiencies in implementation of the project noticed in audit are detailed in the succeeding paragraphs.

1.3.8.1 Delay in getting permission from government agencies

Before awarding the works, permission had to be obtained from the Railways, the National Highway (NH) Authorities, the Public Works Department (PWD) and the Irrigation Department for laying pipes through their land. Total number of permissions to be obtained from these authorities for Cherthala,

Cost over-run due to time over-run of about 13 years was ₹ 1199.95 crore

Delay in getting permission from government agencies and other departments resulted in delay in completion of the project.

³⁷ ₹ 2987.40 crore – ₹ 1787.45 crore

Pattuvam and Thiruvananthapuram schemes were 438 as detailed in **Table 1.11:**

Table 1.11: Scheme wise data of permission required

Names of the scheme	Railways	NH	PWD	Irrigation Department	Total number of cases
Cherthala	13	15	225	59	312
Pattuvam	2	10	73	4	89
Thiruvananthapuram	3	9	22	3	37
Total	18	34	320	66	438

Source: The KWA records.

Audit observed that permission for laying the pipes before awarding the work was received only in one case i.e., from the Railways relating to the Thiruvananthapuram scheme and permission in 427 cases was received only after awarding of the work. Permission for the remaining 10 cases³⁸ was not received as of September 2010. The delay in getting permission from the government departments and other agencies also contributed to the non-completion of schemes.

1.3.8.2 Delay in handing over of sites.

Delay up to 37 months in handing over of sites to contractors of Thiruvananthapuram scheme

Package 4 (Reservoirs) of the three schemes test-checked consisted of 36 Overhead Service Reservoirs (OHSR), six Ground Level Service Reservoirs (GLSR), two administrative buildings, one training centre-cum-hostel building and three staff quarters. As per the conditions of the contracts, 50 per cent of the sites were to be made available on commencement of work (February 2007) and the balance within 150 days (July 2007). It was noticed in audit that there were delays ranging from five to 37 months in handing over of 19 out of 33 sites relating to the Thiruvananthapuram and Cherthala schemes (**Appendix VI**). The reasons for the delay in handing over the sites were non-shifting of pipes stacked by the KWA, non-shifting of the existing pipelines and electrical lines, non-availability of site for dumping, non-receipt of land from the State Government and delay in acquisition of land. However, there was no delay in handing over of sites (15) of the Pattuvam scheme.

1.3.8.3 Inadequate Source of Thiruvananthapuram Scheme

Storage capacity of the water source in Thiruvananthapuram could not be increased

The water demand for the year 2006 was assessed as 264 million litres per day (mld) and the projected demand on completion of the first phase in 2021 was assessed as 294 mld. Against this, the existing capacity of the water treatment plants (WTP) of the Thiruvananthapuram scheme was only 190 mld. The additional capacity of WTP required to meet the projected demand of 294 mld in 2021 is 104 mld at Aruvikara. One new WTP of 74 mld (capacity) was constructed at Aruvikkara and partially commissioned in May 2010, thereby achieving the targeted capacity for the year 2006.

The reservoir at Aruvikkara is the source of supply to the Thiruvananthapuram scheme and the dam at Peppara is to ensure a steady discharge of water to the reservoir. The existing 40 mcm³⁹ storage capacity of the dam is not sufficient to fully utilize the installed capacity (264 mld) of the WTPs. The storage capacity could be increased to 70 mcm by closing the four radial gates.

³⁸ Nine cases from NH and one case from Irrigation department.

³⁹ Million cubic metre

However, the closure would submerge 267 ha of forest land and clearance from Government of India (GOI) was required for the diversion of forest land. The State Government in June 1998 requested permission of GOI for diversion of the forest land. The Ministry of Environment and Forests in March 2003 informed the State Government that the proposal could not be considered under the Forest (Conservation) Act, 1980 and treated the proposal as closed. The CE of the project stated (September 2010) that the present storage at Peppara dam would be sufficient for 128 days supply only. If the dry spell exceeded this limit, water scarcity would be experienced and permission for closing the shutters would be inevitable.

1.3.8.4 Extra expenditure due to defective estimation

Extra expenditure of ₹ 37.86 lakh due to non-inclusion of earth filling work in the original estimate

Defective estimation of the Kerala Water Supply Project resulted in enhancement of the rate over and above the accepted Bill of Quantities (BOQ) rate as illustrated below:

i) The construction of 18 reservoirs for the Cherthala scheme was awarded (December 2006) to M/s Engineering Projects India Ltd, Chennai for a contract amount of ₹ 46.61 crore. The work was awarded at 38.87 per cent above the estimate prepared based on the 2004 Public Works Department Schedule of Rates and the work commenced in February 2007. Five of the reservoir sites were in low-lying areas which required earth filling. As there was no provision for earth filling in the original BOQ, this work was executed as an extra item at the negotiated rate of ₹ 694.79 per cubic metre (cu.m) of earth filling for a quantity of 21261 cu.m. Had the earth filling work also been included in the original estimate the rate would have been only ₹ 516.74⁴⁰ per cu.m. Non-inclusion of this item in the original BOQ resulted in extra expenditure of ₹ 37.86 lakh. The CE of the project stated (September 2010) that the necessity for additional earth filling of the reservoir sites was not identified during the investigation, design and tendering stage and some sites proposed earlier were changed due to non-acquisition of land. The land already in possession and alternate sites located were water-stagnated areas and earth filling was inevitable.

Extra expenditure of ₹ 43.87 lakh due to non-quantification of hard rock excavation

ii) Earthwork for laying transmission mains in Pattuvam under Package 2 included earth work excavation for all classes of soil other than hard rock (238477 cu.m) and excavation in hard rock (1000 cu.m) at the rate of ₹ 240 per cu.m and ₹ 545 per cu.m respectively. The presence of hard laterite at the site was noticed during execution and KWA entrusted the soil test to the National Institute for Rock Mechanics (NIRM), Karnataka. Based on the sample survey, NIRM in September 2008 suggested identification of strata using scientific methods⁴¹ as projections based on surface exposures and visual observations could often lead to ambiguity at the actual excavation stage. However, the consultants recommended considering 10 per cent of earthwork excavation in all classes of soil as hard rock since there were reaches and strata of hard laterite in the pipeline route which could be classified as hard rock. Treating 10 per cent of earthwork excavation in all classes of soil as hard rock instead of quantifying the excavated hard rock resulted in extra expenditure of ₹ 43.87 lakh for 10 per cent of 177537 cu.m of

⁴⁰ Based on 2004 Schedule of Rates including tender excess of 38.87 per cent

⁴¹ Core drilling, sub surface mapping using ground penetration radar or seismic techniques

earthwork paid for as of March 2010. The CE of the project, stated (September 2010) that the payment was released on the recommendation of the consultants and the amount would be adjusted in future bills depending on the quantification of hard rock as per the findings of NIRM.

1.3.8.5 Work executed beyond the scope of estimate

Construction of roads which were not part of the scheme resulted in extra expenditure of ₹ 1.36 crore

i) The main objective of the project was to provide potable water to quality affected areas. However, the pipe laying works relating to raw water and clear water pumping mains were spread over many Panchayats which did not directly benefit from the project. The Panchayat authorities and local residents hindered the pipe laying works and demanded improvement of the roads after laying of pipes and constructing/resurfacing of other roads in exchange for allowing the laying of pipeline. Such additional works which were not envisaged originally resulted in an extra expenditure of ₹ 1.36 crore in three cases in Cherthala and Thiruvananthapuram schemes as detailed in **Table 1.12**.

Table 1.12: Details of expenditure towards formation of roads

(₹ in crore)

Name of Scheme	Name of Panchayat /district	Expenditure
Package -1- Cherthala	1.Vellore /Kottayam	0.62
	2.Maravanthuruthu/Kottayam	0.27
Package-2 - Thiruvananthapuram	Aruvikara/Thiruvananthapuram	0.47
Total		1.36

Source- The KWA Records

The CE of the project stated (September 2010) that the works were accepted by the KWA in the meetings convened at the Government level to facilitate project implementation.

Payment of ₹ 72.80 lakh for deleted items of work

ii) Test check of records of works revealed that ₹ 72.80 lakh was paid for supply of goods which were deleted from the scope of works in two instances as detailed in **Table 1.13**.

Table 1.13: Details of deleted works

(₹ in lakh)

Package	Deleted work	Goods Supplied	Amount paid	Details of payment
Package 2- Thiruvananthapuram	Manvila SCADA/Telemetry station	Plant supply and installation-7 items.	42.70	Bill nos 5,9,10 and 12 paid during 3/2009 to 5/2009
Package 4- Cherthala	OHSR Aroor 2	PE 450mm pipe 1440m	30.10	Bill nos 1,2 and 3 paid during 6/2007 to 11/2007

Source- The KWA Records

The CE of the project stated (September 2010) that the equipment supplied in the case of Manvila SCADA/Telemetry station would be utilized /installed at the Manvila reservoir site in spite of space constraints and that already 600 metres of pipes relating to the OHSR Aroor 2 scheme were used in another stretch by the same contractor and balance would be accounted for as spare pipes. However, as per the terms and conditions of contract, the contractor

had to provide 10 pipes (60 metre) of each class laid as spares on conclusion of the work and the balance⁴² 780 metre would remain unutilised.

1.3.8.6 Work not yet commenced

The following works had not been taken up so far.

(i) Rehabilitation of Thiruvananthapuram scheme

The scheme envisaged rehabilitation of the existing water distribution system in the Thiruvananthapuram region laid way back in 1933. The rehabilitation programme was not started as of September 2010. The CE of the project stated (September 2010) that the rehabilitation work could be taken up only after completing the present augmentation work. The delay in completion of the augmentation work of the above schemes would also affect the commencement of the rehabilitation work.

(ii) House service connections at Thiruvananthapuram

Package 3- Thiruvananthapuram scheme envisaged 11,142 house connections to be forwarded by the contractor. The contractor M/s Electrosteel Castings Ltd. Kolkata informed (May 2007) the consultants that the manufacturing clearance for the materials required for service connections which may be required while laying distribution lines had not been received and that it would not be possible to take up the house connection work later in areas where the pipe laying had already been completed, including backfilling/restoration work. The work was not started as of September 2010.

The CE of the project stated (September 2010) that the scheme was aimed to a great extent for augmentation of supply to existing consumers. The newly served areas were limited to portions of three panchayats. The number of eligible applications received for house connections was 266 as of March 2010.

1.3.9 Non-recovery of Central excise duty exemption

Government of India in September 2002 exempted Central excise duty (CED) payable on all items of machinery/equipment required for setting up of Water Treatment Plants (WTP) and pipes laid from the source to WTP and up to the storage point subject to submission of certificates by the project authority (KWA). This exemption was extended from March 2007 onwards for pipes of size exceeding 200mm (diameter) if such pipes formed an integral part of drinking water supply projects.

The work of laying distribution systems (Package 3) for the three schemes test- checked were awarded in October 2006 and the contractor firms claimed CED exemption for the pipes above 200mm diameter supplied from March 2007 onwards. As the quoted rates were inclusive of CED, KWA insisted that the benefit of CED exemption availed by the contractor should be passed on to the Authority. This was contested by the contractor firms and the KWA in June 2007 agreed to pass on 43 per cent of the CED exemption to the contractor firms. The sharing of CED exemption was not justifiable as the tax exemption was granted to minimize the project cost of the water supply schemes. Non-recovery of CED exemption had resulted in an undue benefit of

⁴² 1440-(600+60)=780

Rehabilitation of water supply system not started

Non-recovery of Central excise duty exemption of ₹ 6.32 crore

₹ 6.32⁴³ crore to the contractor firms of Thiruvananthapuram and Cherthala schemes as of March 2010. Rupees six lakh was kept under deposit (June 2009) from the contractors bill towards CED exemption availed by the contractor firm of Pattuvam.

The CE of the project stated (September 2010) that the reason for non-recovery of CED exemption was delay in procedural formalities as the contractors had not provided separate prices of materials and working charges. However, the legal consultant opined that the benefit should accrue to the KWA since the excise duty exemption was in public interest.

1.3.10 Enhancement of price adjustment ceiling

Post-tender change resulted in extra liability of ₹ 3.60 crore to the KWA

Price adjustment for labour, cement, steel and other materials including pipes was provided in the contract agreement subject to a ceiling of 10 *per cent* of the contract price. The Empowered Committee recommended (June 2009) raising this ceiling of 10 *per cent* to 20 *per cent* in respect of the Packages 3 and 4 of JICA contracts for early completion as the whole project attained 50 to 60 *per cent* overall progress and all the schemes except the rehabilitation and augmentation of Kozhikode scheme were expected to be ready for commissioning between November 2009 and May 2010. The State Government accepted the recommendations in September 2009 and raised the ceiling to 20 *per cent*. However, the progress of work was not satisfactory and the overall progress as of March 2010 was only 72 *per cent* against the anticipated progress of 99 *per cent* and the intention of the government for early completion of the project could not be achieved. The additional benefit derived by the contractor of package 3 of the Thiruvananthapuram scheme due to the enhancement of the ceiling limit at 20 *per cent* was ₹ 3.60 crore. The bills for the enhanced rate of Cherthala and Pattuvam schemes were not submitted so far (October 2010). The CE of the project, agreed (September 2010) to the audit observation that no considerable progress could be achieved during this period.

1.3.11 Excess payment to contractor

Excess payment of ₹ 51.29 lakh paid to a contractor

As per part A General Specifications of clause A 8.3 of the contracts, package 2 (Transmission main) of the Pattuvam scheme, all works to be done and goods and services to be provided by the contractor under the contract and other general obligations of the contractor should be valued for payment by reference only to such items provided for it in the BOQ/ schedule of prices. However, many changes were made in quantities of specials and fittings and length of pipes during execution due to modifications in the original design, changes in alignment and insufficient provision in the BOQ. Consequently the actual requirements were reassessed and the original BOQ amended four times which resulted in deletion of items, additions to quantities in the original BOQ and new items. This resulted in supply of materials far in excess of requirement. The excess payment made to the contractor towards these deleted items (14 items) and the items supplied in excess (47 items) (**Appendix VII**) amounted to ₹ 51.29 lakh. The excess payment could have been avoided had the requirement of length of pipe and specials and fittings been properly assessed before awarding the work.

⁴³ Thiruvananthapuram ₹ 4.28 crore and Cherthala ₹ 2.04 crore

The CE of the project stated (September 2010) that the amount paid for the excess quantity supplied over and above the approved quantity would be worked out on completion of the pipe laying work and some of the items supplied in excess of BOQ would be adjusted as spares to be supplied. It was also stated that recoveries would be proposed in the final bill for items which could not be accounted as spares.

1.3.12 Non-levy of Liquidated Damages

Non-recovery of
` 22.58 crore towards
liquidated damages for
delay gave undue
advantage to a
contractor

As per the bid documents, the contractors had to pay damages for delays if they failed to comply with the period of completion. Audit scrutiny revealed that five contractors could not complete their work within the original period of completion or extended period mainly due to non-mobilisation of adequate men and material at site. Monsoon and inflation also contributed to the delay. Non-recovery of liquidated damages leviable up to March 2010, resulted in unintended benefit of ` 22.58 crore (**Appendix VIII**) to the contractors. The CE of the project stated that (August 2010) the finalization of liquidated damages would be made while deciding the extension of time of completion of the contracts.

1.3.13 Monitoring

Monitoring was not
effective

i) The Government constituted (March 2004) an Empowered Committee, Co-ordination Committee and a Committee to release funds to KWA to implement the project on a fast track basis. The CE of the project conducts monthly project review meetings to monitor the progress of the works. However, the progress of the works was not as planned, mainly due to inadequate mobilisation of men and materials and non-compliance of the time schedule by the contractors. A proper mechanism was not evolved before commencing such big projects to ensure efficient coordination between government departments/agencies and KWA to obtain timely permission for pipe laying works.

ii) As per clause 5.8 of the agreement executed between KWA and the consultant, the consultants had to maintain proper accounts and records of the service rendered by them in accordance with internationally accepted accounting principles and to permit KWA to inspect the same. KWA had to appoint auditors to audit the accounts. KWA neither did such inspection nor arranged the audit.

The CE of the project stated (September 2010) that the appointment of the independent auditors had not been materialized so far and steps would be initiated for the appointment of the same.

1.3.14 Conclusion

The main objective of the project to provide potable water to the three rural areas and the augmentation and the rehabilitation of water supply in two urban areas could not be achieved even after a lapse of 13 years since the execution of the first agreement of the project (1997). Consultants were appointed only in 2003. There were further delays due to inadequate and incomplete investigation and survey and defects in the preparation of designs and estimates. This, in turn, resulted in significant time and cost over-run. Clearance from the Ministry of Environment, Government of India could not be obtained to increase the storage capacity of the Peppara dam to ensure

supply of targeted quantity of water for Thiruvananthapuram scheme. House service connections in Thiruvananthapuram and the rehabilitation of the Thiruvananthapuram scheme were not taken up. Non-recovery of Central excise duty exemption availed of by contractors resulted in undue benefit to them. Contractors also could not observe the time schedule prescribed which caused extension of period of completion. Liquidated damages were not levied for the delays in completion.

1.3.15 Recommendations

- Speedy completion of the schemes should be ensured to avoid further increase in the cost of the project.
- Steps to ensure full storage capacity of the Peppara dam should be initiated.
- Central excise duty exemption should be recovered to minimize the project cost.
- Recovery of liquidated damages should be enforced.
- Monitoring should be made effective to ensure completion of the work in time.

The above points were referred to Government in September 2010, reply had not been received (November 2010).

INFORMATION SYSTEM AUDIT

FOOD, CIVIL SUPPLIES AND CONSUMER AFFAIRS DEPARTMENT

1.4 Computerisation in Civil Supplies Department

Highlights

The public distribution system (PDS) came into existence in Kerala with effect from 1 July 1965. Kerala State Civil Supplies Department is vested with the role of market intervention through the effective maintenance of the PDS, enforcement of market discipline and promotion of consumer awareness and protection of their interest. Computerisation process started in the department in 1995-96 and succeeded in issue of computerised ration cards to nearly 69 lakh households in the State. A review on the performance of the computerisation project revealed effective utilisation of personnel in possession of technical know-how in the management of the system by making use of the potential of qualified people, wherever available. At the same time it also brought to light various shortfalls/deficiencies in organisational and management controls, in planning and design of the system, in exercise of internal controls, etc., obstructing its usefulness as a management information system.

Lack of proper IT planning and absence of IT Steering Committee led to casual and delayed implementation of the IT system in the organisation.

(Paragraph 1.4.11)

In the absence of User Requirement Specifications (URS) the extent to which the intended benefits of the computerisation were achieved, could not be assessed.

(Paragraph 1.4.12.1)

Improper designing of database led to development of a system which was deficient for online processing and real-time generation of reports.

(Paragraph 1.4.13.1 and 13.2)

The system is devoid of proper login information and vulnerable to miscreant user activities.

(Paragraph 1.4.17.2 and 17.3)

The principles of segregation of duties were violated as revealed from majority of records.

(Paragraph 1.4.18)

Overlooking of input controls caused a number of mistakes in crucial data captured and 14.46 percentage of duplication in house numbers, which is the unique data to ensure authenticity of ration cards.

(Paragraph 1.4.20.1 and 20.2)

Imperfect planning at design stage led to sparse user response causing waste of resources and annual financial loss of ` 17.20 lakh.

(Paragraph 1.4.20.4)

1.4.1 Introduction

The Civil Supplies Department, Government of Kerala is vested with the role of market intervention through the effective maintenance of the public distribution system (PDS), enforcement of market discipline and promotion of consumer awareness and protection of their interest. The PDS came into existence in the State with effect from 1 July 1965. The department also has to manage private agencies associated with the distribution process.

1.4.2 Organisational set-up

The Secretary to Government, Food, Civil Supplies and Consumer Affairs is at the apex level. The Commissioner of Civil Supplies is the Principal Head of the Department, assisted by the Director of Civil Supplies (DCS), who is entrusted with the day to day administration of the Department. The Secretary to Government holds additional charge of Commissioner of Civil Supplies at present. The Director is assisted by Controller of Rationing at the Directorate, Deputy Controllers of Rationing (DyCR) for two zones⁴⁴, 14 District Supply Officers (DSOs) and 69 Taluk Supply Officers (TSOs)/ City Rationing Officers (CROs).

1.4.3 Objectives of computerisation project

The main objectives of computerisation were

- Ø Implementation of ration management software in all locations viz. TSO/CRO, DSO and DCS.
- Ø Designing, developing and deploying software packages for the administrative, financial and management functions of DCS in all TSO, DSO and at the Directorate.
- Ø Establishment of a computer network covering the TSO and the DSO Offices and linking them to the Directorate and Secretariat.

1.4.4 Introduction of Information System

The department had invested an amount of ` 36.38 lakh on procurement and installation of various IT assets during the period from 1995-96 to 1997-98. However, no software was developed⁴⁵ to make use of its IT assets. During 2001-02 NIC⁴⁶ started developing software titled 'TETRA PDS' (Targeted Efficient Transparent Rationing Allocation System for the Management of Public Distribution System) meant for the computerisation of the following five functional activities of the department:

⁴⁴ South zone stationed at Kollam and North zone at Kozhikode

⁴⁵ Mention was made in paragraph 3.15.1 of Comptroller and Auditor General's Audit Report (Civil) for the year ended 31 March 1999 regarding unfruitful expenditure.

⁴⁶ National Informatics Centre (NIC) is a Science and Technology institution of the Government of India, established in 1976, for providing e-Government/e-Governance Solutions in Government Sector.

- Ø Ration Card Management System (RCMS) Version 4.0: A work flow based Ration Card Management System developed in vb.net technology in Client Server model.
- Ø Web based Allocation software: A work flow based software for allotment of food grains to Authorised Wholesale Dealers (AWDs) and Authorised Retail Dealers (ARDs). Permit and License Management also form part of the software developed in vb.net technology.
- Ø Inspection monitoring software: This application is meant for monitoring the daily inspections of retail depots carried out by Rationing Inspectors.
- Ø Web based DCB software: Meant for entering the TSO level demand, collection and balance details.
- Ø Web based Off-take software: meant for entering the TSO level weekly stock details of wholesale and retail dealers.

Status of Hardware and software

The department is in possession of 75 servers (including six high end servers), 304 PCs, 97 LaserJet printers, 83 DMPs, 69 switches (eight port) and 69 UPS (3 KVA). The application server runs MS SQL Server database on MS Windows Server 2003 in the LANs at TSO/CROs. The department switched over (September 2010) to centralised database in web interface and started the services for online applications from the public for new/modified ration cards. The centralised database is maintained in PostgreSQL in addition to the decentralised database continued to be maintained at TSO/CROs in MS SQL Server. Data concurrency is envisaged to be ensured by periodic data transfer between the central server and field offices.

1.4.5 Financial Status

Out of total amount of ` 6.5 crore sanctioned and allocated to the department during the period from 2000-01 to 2009-10, a sum of ` 1.4 crore only could be incurred for computerisation in the department and balance of ` 5.1 crore (` 4.56 crore in 2002-03) was surrendered during the period due to non-utilisation of the same.

1.4.6 Audit objectives

The objectives of the information system review were to assess the extent of achievement of the objectives of computerisation by ascertaining whether:

- Ø Effective organisational and management controls were in place to ensure safeguarding the business assets;
- Ø Adequate internal and system controls were in place to ensure the achievement of intended results;
- Ø Adequate security measures and business continuity planning were in place;
- Ø Basic attributes of data/information like confidentiality, integrity, availability, reliability, compliance, etc., are maintained and
- Ø The electronic system was successful in replacing the manual system.

1.4.7 Scope of audit

We evaluated the implementation of RCMS, Allocation, Inspection Monitoring, DCB and Off-take software packages. Since packages other than RCMS were not widely put to use, performance of RCMS package including the web based application was reviewed in detail. Management of IT assets, adequacy of human resources and internal control measures were evaluated in general.

1.4.8 Audit methodology

Audit was conducted during June - September 2010. An entry conference was held with the Secretary to Government, Food, Civil Supplies and Consumer Affairs on 24 June 2010. In addition to the Directorate at Thiruvananthapuram, audit team visited offices of two Deputy Controllers of Rationing⁴⁷, four District Supply Offices⁴⁸ and 17 TSO/CROs⁴⁹ for verification of the working of the system and held interview, on the basis of questionnaire prepared for the purpose, with end-users to assess the usefulness and user-friendliness of the software. During field visits, we also verified 30 basic records (application for ration cards) each in 17 offices with the data captured in the system. As separate databases were maintained for 69 TSO/CROs⁵⁰, backup data in respect of three TSO/CROs⁵¹ was analysed using CAATs⁵². Although we obtained house hold data from the Corporation of Thiruvananthapuram, in view of the non-standardisation in house number data as referred to in paragraph 1.4.20.2, we could not compare the RCMS data with that of the Local Bodies to ascertain the authenticity of house numbers in the RCMS. The review was sent to the Government in October 2010 and discussed in the exit conference held in December 2010.

1.4.9 Audit Criteria

The Essential Commodities Act, 1955, Public Distribution System (Control) Order, 2001, Kerala Rationing Order, 1966, Kerala State Civil Supplies Department Manual, Vision Document, Project Proposal and Software Requirement Specification of the application packages were relied upon.

1.4.10 Acknowledgement

We would like to place on record our appreciation on the initiatives of the State Government in its efforts in bringing about the fruits of information technology in the day-to-day life of the common man in the form of ration cards. We noticed something praiseworthy in the department that it effectively utilised the services of personnel possessing technical knowledge in the field of IT and hardware, wherever available, in the management of the information system. We would also like to place on record our sincere thanks

⁴⁷ South zone at Kollam and North zone at Kozhikode

⁴⁸ Ernakulam, Kannur, Malappuram, and Thiruvananthapuram

⁴⁹ Geographically stratified random samples were chosen in four districts of Ernakulam, Kannur, Malappuram and Thiruvananthapuram.

⁵⁰ The department made available to us a merged database relating to 69 TSO/CROs in compressed format with a file size of 67.2 GB. We were informed that the original database on disk (in PostgreSQL) had a size of 308 GB.

⁵¹ CRO, Kochi, TSO, Neyyattinkara and Perinthalmanna

⁵² Computer Assisted Audit Techniques

for the cooperation extended by the Government of Kerala, the Commissioner, Director, officers and staff, especially the heads of offices we visited.

Audit Findings

1.4.11 Management Direction and Planning

1.4.11.1 IT Planning

Information Technology planning provides a structured means of addressing the impact of technologies, including emerging technologies, on an organisation. We noticed that the whole computerisation process lacked focus in achieving resource optimization in the absence of IT planning, system development, installation of modules and ensuring continuance of operational staff.

1.4.11.2 IT Steering and Monitoring Committees

IT Steering Committee comprising of members from senior and middle management and all user departments within an organisation ensure achievement of business goals. However, we found that no IT Steering Committee was formed by the department. This has resulted in non-utilisation of various software packages. Our visits of 17 field offices revealed the following:

- Allocation software was put to use only in one office,
- DCB software was put to use only in three offices,
- Off-take software was put to use only in three offices and
- Inspection monitoring was not put to use in any of the offices

Although the primary objective was implementation of ration management software in all locations viz. TSO, DSO, DCS, we noticed that the Directorate and District Offices were wholly excluded. All these indicate that the department lacked focus in achieving the optimum results.

The Government stated (December 2010) that an IT Division has since been constituted for the successful implementation of the IT initiatives. However, we are of the view that Government should ensure inclusion of top management in these Committees.

1.4.12 Status of Documentation

1.4.12.1 User Requirement Specifications (URS) and System Requirement Specifications (SRS)

The properly documented User Requirement Specifications (URS) obtained from users and System Requirement Specifications (SRS) by the software development team ensures that the needs of the users of the system have been taken care of and the software developed meets business requirements. However, we noticed that User Requirement Specifications and User Manual were not prepared. Though System Requirement Specifications were prepared, the same were not formally accepted by the department. Also, there was no signing off of the project. In the absence of URS, we were not in a position to assess as to what extent the intended benefits of the proposed computerisation have been achieved.

1.4.12.2 Lack of documentation resulting in poor version control

Adequate documentation is vital to resume operations within a reasonable time in case of system failure. Exercising proper control over software versions require sufficient documentation, especially in decentralised data processing through separate LANs, to ensure uniformity of installation of applications across field offices.

In the absence of proper documentation and exercising of supervisory controls, the department could not ensure installation of patches⁵³ for modification of the system uniformly in all the offices. Our field visits of 17 offices revealed installation of patches as indicated below:

- one patch each in three offices
- two patches each in two offices
- three patches each in three offices
- four patches each in two offices
- In seven offices the system administrators could not state the exact number of patches

The Government stated (December 2010) that actions would be initiated to ensure version control.

1.4.13 System Development and Design Deficiencies

1.4.13.1 Improper designing of database

Adherence to data normalization principles ensures non-redundancy of data, faster storage, processing and retrieval, minimum time in data fetching and effective service to users. As storage of images requires multiple times of space than text and numbers, best IT practices demand that images are not made part of tables used for frequent data fetching. Instead these are to be stored in separate tables/database/servers with proper links to data fetching tables.

We noticed that images of above 68 lakh ration card holders were stored in the primary table of RCMS database hosted in the central server. In data analysis of three offices, we found the ratio between the size of images and data other than images as thirty six times.

As part of data analysis we tested the processing time of executing a query in the table with digital images followed by executing the same query after deleting the images from the table. Our test revealed that the latter execution of query was 19 times faster than the former.

Thus improper design resulted in unmanageable data size making it incapable for online processing. The improper planning at design stage forced the department to resort to periodic batch processing instead of online processing and continue to maintain separate mid-range servers in all the 69 field offices. The effective life of computer equipments being five years, as all these servers are four years old, they would be required to be replaced within one year. It would cause avoidable fixed and variable costs.

⁵³ A patch is a piece of software designed to fix problems with or update a computer program or its supporting data.

The Government stated (December 2010) that digital images would be de-linked from the main table and stored in a separate table.

1.4.13.2 Incapability of the system in generation of real-time reports

Another impact of the deficiency referred to in previous paragraph is that it made the system incapable of generation of real-time reports. Although there were 14 reports in RCMS, we noticed that none of these reports were real-time reports. All of these were offline reports generated on a previous occasion. The web page showed a window titled 'card abstract date help' containing two dates (26 August 2009 and 30 October 2009), on which the report was previously generated and stored in the server. When we tried to generate reports for dates other than these, we noticed popping up of error messages displaying "Card abstract details is not yet processed for this date." We also noticed an offline report on 'summary of ration cards in rural and urban areas-State level', which reflected zero values in all columns.

The Government stated (December 2010) that the modification to the data structure would solve the issue.

1.4.13.3 Lack of foresight adversely affecting user-friendliness

As the ration card is a document prepared in the vernaculars⁵⁴, the main hurdle in equipping the employees to acquaint themselves with the system is text processing in the vernaculars. At present the user is required to be proficient in vernacular typing, even though they are not familiar with vernacular typing. Users, therefore, shy off from using the system.

Packages are available in the market for text processing in the Indian vernaculars following the principle of transliteration. Thus by keying in 'saritha' in English it would output the text in Malayalam as shown below:

സരിത

Such packages can be integrated with database application as done by Indian Railways in their ticket reservation system. The journey charts prepared in bilingual by the Railways are the results of transliteration process. Had there been proper planning at the design stage, the system could have been integrated with such packages and the user involvement could have been enhanced.

The Government stated (December 2010) that soft keyboard for typing in Malayalam would be provided in the decentralised servers to enhance user-friendliness.

1.4.13.4 Absence of mandatory provisions

The primary requirement of a ration card is assigning any one of the family members as owner of the card, which is essential. There can be a ration card for a single person without any family members. On the contrary, no ration

⁵⁴ Malayalam being the official language of the State, the Ration Card is prepared in Malayalam except for border districts, where they are printed in bilingual (Malayalam & Tamil in Palakkad; Malayalam and Kannada in Kasaragod) for the benefit of Tamil and Kannada speaking people.

card should be generated without an owner. However, in the absence of mandatory provisions we noticed in TSO, Perinthalmanna that one out of 30 ration cards (Card No. 95591) was printed without assigning an owner (*udamasthan/ udamastha*) to it.

Similarly, it is mandatory that every member of the family should inevitably be related to the owner of the card. The master table on relationship contains 44 items. However, we noticed in CRO, Thiruvananthapuram North that one out of 30 ration cards (Card No. 39993) was printed without assigning any relationship to one of its members.

These indicate that mandatory provisions were not enabled in the system.

The Government stated (December 2010) that necessary modifications would be made in the software to rectify the error.

1.4.13.5 Deficiencies in software

The data entry form of RCMS package has three tabs (pages). Data was not captured in tab on ‘bank loan details’. The tab on ‘general card details’ contains a column to enter the total income of the family while the other tab on ‘family member details’ has columns to enter income of individual family members. The proper design of the software should be permitting data entry only in columns for ‘individual member income’ and enabling the system to reckon the total income of the family.

Duplication of data entry would not only adversely affect user-friendliness of the package, but would also be prone to avoidable data entry mistakes. We noticed in 17,896 out of 3.69 lakh records that the total income of family was less than the sum of individual income of family members.

The Government stated (December 2010) that steps would be initiated to confine data entry to individual member income and enable the system to reckon the family income.

1.4.13.6 Incorrect design of front-end tool

In the analysis of front-end tool we noticed that the name entered in the tab on ‘general card details’ was automatically displayed in the second on ‘family member details’. When a piece of data is captured in the system and if it is required to be displayed elsewhere in the data input form, the practice to be followed is displaying the data in a text box⁵⁵ not enabled for editing lest it should be prone to mistakes and consequent data inconsistencies. However, we noticed that the text boxes were editable. Data analysis revealed that there were differences in 13 out of 3.69 lakh records in ‘card master’ and ‘family master’ tables.

The Government stated (December 2010) that the text boxes have been made ‘read only’.

⁵⁵ A ‘text box’ is a common element of graphical user interface (GUI) of computer programs. Its purpose is to allow the user to input text information to be used by the program.

1.4.13.7 Absence of management information system reports

A management information system (MIS) is a process that provides information needed to manage organizations effectively and forms part of the overall internal control procedures in a business.

The department discharges the responsibilities of public distribution, enforcement of market discipline and promotion of consumer awareness and protection of their interest. It has two objectives - the first is to ensure availability of food grains to everyone and the second to ensure their availability at price affordable for even the poorest in the State. However, we noticed that no MIS reports were made available to the top level management on allocation and distribution of foodgrains to authorised wholesale/retail dealers and ration depots.

The Government stated (December 2010) that action would be initiated for generation of the reports.

1.4.13.8 Imperfect designing of master table

Accuracy of data on Master and Standing files is of vital importance. Data stored in master and standing data files is critical to the processing and reporting of financial and operational data. We noticed that the master table on relationship did not contain feminine gender term in Malayalam for 'owner (*udamastha*)'. Similarly, master table on profession did not contain feminine term for 'student (*vidyarthini*)'. In their absence, cards owned by women were printed with *udamasthan* and girl/woman student with *vidyarthi*.

The Government stated (December 2010) that modifications would be incorporated in the package.

1.4.14 IT assets

Safeguarding of hardware and software is critical to business continuity. Assets of business are required to be watched through asset registers. However, we noticed in 2 offices that hardware items like server (1), computers (4), printers (2), UPS (1), etc., were not entered in the asset register maintained.

The Government stated (December 2010) that directions would be issued to ensure that all hardware assets are taken into stock.

1.4.14.1 Malfunctioning of computers and printers

Effective functioning of hardware is an essential requirement for ensuring availability of data, one of the basic characteristics of data. We noticed the average down time in respect of computers and printers to be 33 and 7 days respectively during the first 9 months of the AMC period in 17 offices. While in 3 cases the period of malfunctioning exceeded 150 days in respect of computers, in 2 cases printers were down exceeding 30 days owing to flaws in terms of Annual Maintenance Contract (AMC), as pointed out in the succeeding paragraphs.

The Government stated (December 2010) that action would be initiated to prevent recurrence of hardware malfunctioning.

1.4.14.2 Lack of control over AMC provider

According to the terms of AMC, in respect of computers and printers, entered into with M/s ACS Technologies, the maximum permissible downtime would be 48 hours. The preventive maintenance was to be done once in three months. However, we noticed that fault log register of hardware was not maintained to watch the duration of downtime. No registers were maintained to monitor the preventive maintenance as well.

We also noticed the following deficiencies in the service level agreement executed with the vendor:

- There was no clause relating to levy of penalty in the event of failure in timely providing of services.
- Decision whether a malfunctioning was the cause of mishandling or not was left solely to the report of the service engineer of the vendor without any say by the department or any third party opinion, like from any other Government departments/agencies. The vendor's decision was final and binding on the department.

The Government stated (December 2010) that penalty clauses would be incorporated in the agreement.

1.4.14.3 Malfunctioning resulting from flaws in terms of AMC

From the field visits of 17 offices we noticed the flaws in terms of AMC resulting in the following:

- The average time taken to complete a fault call was 8 days. The delay was found to be more than 14 days in 5 offices.
- The failure of AMC provider to attend to fault calls compelled 3 offices to take computers and printers on hire from other local vendors.
- Two offices used to get the hardware items repaired by other vendors.
- Preventive maintenance of computers and printers was not done in any of the offices.

In the absence of preventive maintenance, we noticed dust accumulation in servers in eight offices, adversely affecting their performance and life expectancy. The scenes in Figure 1 depict dust accumulation on the servers.



Figure 1

The Government stated (December 2010) that preventive maintenance of the hardware would be ensured.

1.4.15 General Controls

1.4.15.1 Organisational and Management Controls

Organisational and management controls are the high level controls adopted by management to ensure that the computer systems function correctly and that they are satisfying business objectives. We noticed that the controls put in place were not sufficient to ensure that the IT activities are adequately controlled.

1.4.15.2 Absence of change control management

Change control management reduces the possibility that unnecessary changes will be introduced to a system without foresight, introducing faults into the system or undoing changes made by other users of software. We noticed that no change control procedure was followed in the department. Changes to the source code were not documented and got approved at senior management level. Patches were seen installed on need-basis without proper documentation.

A reference was made in paragraph 1.4.12.2 on the differences we found in patches installed in various offices.

1.4.15.3 Absence of continuity of operational staff

Supplyco⁵⁶, a fully owned Government company, is managed by the employees of the department on deputation. The entire staff of the Civil Supplies department is deputed to Supplyco on periodic rotations of five years with the effect that no employee has continuous service in the department for over a period of two years.

The department did not ensure a specific team of employees adequately trained in the system with a continuous service of minimum of five years required for continuity of the project. Without prejudice to the fact of employees' reluctance caused by lack of user-friendliness of the application software referred to in the paragraph 1.4.13.3, it is worth mentioning that though the computerisation process started in the 1990s, the department has not initiated steps to recruit personnel with IT exposure and text processing skill in the vernaculars.

The Government stated (December 2010) that continuance of computer operating staff for a minimum period of five years would be ensured.

1.4.15.4 Neglect of internal audit

Internal audit is a tool, by which an organisation can ensure safeguarding assets and compliance with laws and regulations. The departmental manual stipulates conducting of internal audits twice a year. However, we noticed that in 13 out of 17 offices the frequency of internal audits were more than 12 months. The interval between two internal audits extended up to 40 months.

⁵⁶ The Kerala State Civil Supplies Corporation, better known as Supplyco, incorporated in 1974 as a fully owned State Government company to meet the limited objectives of regulating the market price of essential commodities at reasonable prices.

The Government stated (December 2010) that steps would be initiated for conducting the internal audits regularly.

1.4.15.5 Absence of audit module

An audit module is a program, forming part of software development, for equipping the management to exercise effective system controls. The module contains standard and customized generation of reports in graphical user interfaces for easiness in utilisation. But we noticed that the systems did not incorporate any audit module. We also noticed that the internal audit teams were not auditing electronic resources and system controls as they were not trained in the information system.

The Government stated (December 2010) that steps would be initiated for preparation of audit module.

1.4.15.6 Human resource management- Lack of training

Human resource management (HRM) is the strategic and coherent approach to the management of an organization's most valued assets – the people working there who individually and collectively contribute to the achievement of the objectives of the business.

Although computerisation process started in 1995-96, the employees were not trained adequately in the operation of software. In 17 offices visited, we noticed that employees trained in the software package were less than three percentage. The absence of training had the following impact:

- The department had to depend on outsourced personnel for data entry, verification and even for approval of the card in the computerised system.
- Internal controls like logical access controls and segregation of duties could not be put in place
- Data entry mistakes could be detected only after taking the print outs causing wastage of resources and financial loss as referred to in subsequent paragraph 1.4.20.4.

The Government stated (December 2010) that action would be initiated to impart adequate training.

1.4.16 Physical and Environmental Controls

1.4.16.1 Ineffective physical access control

During field visits, we noticed the following lapses in physical access control:

- The public were permitted entry into server rooms for capturing their digital images in 11 offices.
- While security guarding at night and on holidays was available in the case of office buildings located in Government office complexes, there was no guarding in nine offices functioning in rented buildings.
- One building was in dilapidated condition.

1.4.16.2 Ineffective dust and moisture control

During field visits, we noticed the following lapses in dust and moisture control:

- Dust accumulation in the server machines was noticed in eight offices as referred to in paragraph 1.4.14.3
- Water was seeping through roof/walls in three offices. In CRO, Ernakulam seepage was to such an extent that waterlogging occurred to a height of two cm during rainy season.

1.4.16.3 Lack of ensuring uninterruptible power supply (UPS)

Efficient performance and better life expectancy of electronic equipments require uninterruptible power supply. We noticed that in four offices UPSs were not backed with working battery, thereby adversely affecting the performance of hardware and operating system. In eight offices, the battery backup was below 30 minutes compelling them to remain idle in case of prolonged power failure.

Security policy

1.4.16.4 Lack of information security policy

Confidentiality, integrity and availability are to be the core principles of information security. We observed the following lapses in this regard:

- The department did not have an IT Security Officer and any team assigned with the responsibility of IT services/support.
- Best practices in IT, like IS Security requirements were not made available to users.
- No mechanism was seen for recording and reporting security incidents.

1.4.17 Logical Access Controls

1.4.17.1 Absence of password policy

The importance of password policy is to minimise the risk of unauthorized access and modification of data. We observed the following shortcomings arising from absence of password policy.

- Though complex passwords are enabled and passwords encrypted in the case of users of centralized database, simple passwords are enabled and stored without encryption in servers in field offices. Periodic changes of passwords were not ensured.
- No instructions were issued on password policy specifying the structure and length of password, changing of passwords, secrecy to be maintained, etc.
- The length of password was noticed to be as short as three characters. Users were not forced to change the initial passwords set by administrator.

The Government stated (December 2010) that steps would be initiated to formulate password policy and its adherence ensured.

1.4.17.2 Sharing of login-ids and passwords

Logical access control is exercised through individual login-identifiers and passwords for authentication of users. User identification ensures accountability for user activities so that it acts as a deterrent force in any malevolent user activities.

In 11 out of 17 offices visited, we observed that less than three user-ids were allotted against average staff strength of 11. It compelled users to share user-ids and passwords among them defeating the purpose of exercising logical access controls.

The Government stated (December 2010) that sufficient login-ids would be made available.

1.4.17.3 Failure in deactivating user-ids of retired/transferred employees

Best IT practices demand that in the case of retirement or transfer of employees, the system administrator should immediately deactivate user accounts to prevent unauthorised access to the system. However, we noticed that employees performing the role of system administrators were not provided with the rights for deactivating user accounts. Hence in none of the 17 offices visited, user accounts relating to old staff members were deactivated. In Taluk Supply Offices, Kannur, Thalassery and Tirurangadi there were more than 30 user-ids relating to old staff members.

As a result, the system is devoid of correct login information as to who entered a particular piece of data. This lapse would stand in the way for prevention against miscreant user activities.

The Government stated (December 2010) that deactivation of user-ids would be entrusted to local system administrators.

1.4.18 Inadequate Segregation of Duties

Segregation of duties ensure that the data stored is authenticated at various levels of supervisory officers. Inadequacies in this would increase the risk of errors being made and remaining undetected, fraud and the adoption of inappropriate working practices.

The system provided a workflow automation involving data entry operator, verification at supervisory level and final approval by the head of office. During field visits we noticed that in none of the offices the head of office was approving the data (ration card) through the computerised system. Instead the approval was given by affixing signature on the print out of ration cards. In 11 out of 17 offices the data entry, verification and approval were done in the system by a single user and that too by an outsourced person. Data analysis revealed that in majority of the records, data entry, verification and approval were done by data entry operator, defeating the very purpose of segregation of duties.

1.4.19 Ineffective virus control

Antivirus software is used to prevent, detect, and remove malware⁵⁷, including computer viruses⁵⁸, worms⁵⁹, and trojan horses⁶⁰. Installation of antivirus

⁵⁷ Malware, short for malicious software, is software designed to secretly access a computer system without the owner's informed consent.

⁵⁸ A computer virus is a computer program that can copy itself and infect a computer.

⁵⁹ A computer worm is a self-replicating malware computer program. It uses a computer network to send copies of itself to other nodes (computers on the network) and it may do so without any user intervention.

⁶⁰ A Trojan horse is malware that appears to perform a desirable function for the user prior to run or install but instead facilitates unauthorized access of the user's computer system.

packages helps in reducing threat to data caused by virus attacks. We noticed the following lapses in this regard:

- Only in three offices licensed versions of antivirus packages were installed
- Freeware packages were being used in 14 offices
- None of the offices were updating virus definition files
- Systems were seen infected with virus in 12 offices
- In four offices virus infection caused non-performance of the system for over a week

The Government stated (December 2010) that steps would be initiated for sending virus definition files to field offices periodically.

Application Controls

1.4.20 Input Controls

Organisations employ procedures and controls to ensure that all transactions are authorised before being entered into the computer system so that the data input are complete, accurate and valid.

1.4.20.1 Lack of authorisation of inputs

Accuracy of data captured in the system is generally ensured by three level controls. First of all input data are to be verified and approved at supervisory level before they are entered into the system. Secondly, the accuracy can be controlled by system level validity checks during data entry by incorporating proper validation rules during design of the system. Finally, the data entered in the system can be authorised by approval at supervisory level before they are moved for further processing or generation of reports - printing of ration cards in the instant case.

We noticed that all the three controls were overlooked as revealed from verification of 510 basic records (application for ration cards) in 17 offices with the data captured in the system as indicated below:

- There were large number of records with mistakes in vital data capture (21 mistakes in house number, 10 in relationship, 117 in names and initials, 15 in income and 22 relating to age)
- There were 13 mistakes relating to cooking gas connection, four mistakes in electrification and one mistake each relating to income-tax payee status and kerosene permit.
- While three genuine members were excluded in a card, one ineligible member was included in another card.

While the above mistakes were examples of disregard of first and third controls stated above, the following mistakes, found in data analysis of 3.69 lakh records, could have been avoided, if system validity checks were in place.

- 1,815 records contained income-tax permanent account number (PAN) without the requisite 10 alphanumeric characters.

- 1,695 records showed as income-tax payees, while their annual income was shown less than ₹ one lakh⁶¹.
- 530 records showed monthly income exceeding ₹ 25,000, where PAN were not captured
- 3,142 records showed monthly income exceeding ₹ 609⁶², but their status was shown as below poverty line (BPL)

Data analysis also found that 2,445 ration cards were issued without being verified. A reference was made in paragraph 1.4.18 on overlooking of these controls caused by entry, verification and approval of data by the data entry operator.

1.4.20.2 Non-standardisation in input causing duplicate in house numbers

Standardisation of input data is the basic requirement for further processing of data and accuracy in report generation. The most vital data to ensure uniqueness of data in the RCMS is the house number. While the Local Bodies, the authority for allotting house number, has three columns (ward No., door No., and sub No.), the house number was split only into two columns (wards and house No) without a column for sub number of houses in the system. This deficiency stood in the way of authenticating RCMS data by the department with that of the Local Bodies.

Data analysis also revealed that the data was not standardised. Numerals contained both Arabic and Roman numbers, separator used for sub division of a house number varied, like '-', ':', ';', '/', etc. Ward numbers contained more than two digits, although no Local Bodies in Kerala has more than 99⁶³ wards. We noticed 708 out of 3.69 lakh records contained more than two digits in ward number. The deficiency obstructed us in cross checking for detecting unauthenticated data. Notwithstanding the above, we noticed 14.46 percentage of duplication in house number field.

Had there been proper utilisation of system validation checks and input masks⁶⁴, these mistakes could have been prevented. The Government stated (December 2010) that the house-number data would be split into three levels so as to restrict the possibility of duplications.

1.4.20.3 Non-capture of vital master data

Only 14.09 percentage of records was valid in the name field in the master table 'ARD'. While the name field was filled with '-' in 52.86 percentage of records, other records contained numerals, name of places and junk characters. It would incapacitate the system to generate any valid reports from this data.

⁶¹ Up to the financial year 2005-06 individuals were exempted from Income-tax payment up to ₹ one lakh

⁶² According to Planning Commission, the average monthly income for poverty line was ₹ 287.85 during 1993-94 and ₹ 561.01 in 2004-05 with an annual increase of 8.63 per cent. Applying the same ratio, the average monthly income for poverty line in 2009-10 would work out to ₹ 609.

⁶³ Though according to the latest reorganisation of Wards, the Corporation of Thiruvananthapuram has 100 Wards, house numbers have not been revised accordingly.

⁶⁴ An input mask refers to a string expression, defined by a developer, which governs what a user is allowed to enter in as input in a text box.

1.4.20.4 Failure in validation of records leading to mistakes and consequent financial loss

Owing to employees' reluctance in using the system and the discontinuity of staff as pointed out in paragraphs 1.4.13.3 and 1.4.15.3, the computerisation process had initially outsourced to Keltron⁶⁵, which sub let data entry works to Kudumbashree⁶⁶ units. Finding the percentage of data entry mistakes exceeding permissible limits, the department outsourced the work to C-DIT⁶⁷ at the time of installation of RCMS version 4.0. The agreement with C-DIT stipulated that they should be paid ` 13.85 per card. However, the onus of verification, approval and issue of card was to be ensured by the department.

We noticed that the verification and approval of ration cards, before being printed, were not done by the department as pointed out in paragraph 1.4.18, which resulted in printing of cards with mistakes. We also noticed reprinting of cards at a monthly average of 150 per office. The annual cost of avoidable wastage of resources on account of this would work out to ` 17.20 lakh. The Government stated (December 2010) that instructions have since been issued to field offices for validation of data.

1.4.20.5 Ineffective monitoring of data transfer

A reference was made in paragraph 1.4.13.1 on the inability of the department in proceeding with online processing. The batch processing required every field office to connect to the central server for updation of the LANs by data transfer. The interval for data transfer was stipulated to be every three hours. However, we noticed delay in data transfer in 36 out of 69 offices as indicated below:

- 10 days or more in eight offices
- four to nine days in 13 offices
- one to three days in 15 offices

The delay could have been avoided, if the data transfer was automated by scheduling a procedure. The Government stated (December 2010) that the data transfer would be automated by scheduling.

1.4.21 Business continuity and disaster recovery planning

Business continuity planning (BCP) is working out how to stay in business in the event of disaster.

1.4.21.1 Ineffective environmental control on prevention of fire

The objective of environmental controls is to prevent computer equipments and the information from environmental damage, caused by disasters like fire, flood, theft, etc. During field visit of 17 offices, we noticed the following lapses in prevention of fire:

⁶⁵ Keltron, Kerala State Electronics Development Corporation Limited, is a public sector electronics company

⁶⁶ Kudumbashree unit is women oriented, community based, self help group project forming part of the State Poverty Eradication Mission of Government of Kerala launched in 1998.

⁶⁷ Centre for Development of Imaging Technology (C-DIT) established in 1988 by Government of Kerala with a vision to ensure advancement of research, development and training in imaging technology.

- Fire/smoke detection devices were not installed in 16 offices. In TSO, Thalassery, where the devices were installed, we observed that employees were not trained for handling emergency situations. They were also not certain whether the apparatus was in working condition.
- Fire extinguishers were available only in 9 offices
- Rags and waste papers were seen heaped up in server rooms in 5 offices
- Garbage was seen dumped on battery sets in 2 offices

The scenes in Figure 2 depict the condition of UPS rooms vulnerable to fire caused by heat emission from UPS and battery.



Figure 2

1.4.21.2 Insufficient data backup

Backup (making copies of data) is useful in restoring to a state following a disaster and also to restore files after they have been accidentally deleted or corrupted. Though the department had directed to take daily backups, no procedures were prescribed. Backup registers were not maintained in any of the offices enabling head of offices to ensure taking of backups. In its absence, we noticed that backups were taken only twice/thrice a week in three offices, weekly in five offices and fortnightly in four offices. The Government stated (December 2010) that instructions have since been issued to ensure daily backup.

1.4.21.3 Absence of external data backup

We noticed the data size in every office as more than one GB. However, DVD writers⁶⁸ were installed only after January 2010. In two offices it was installed in August, four offices in July and five offices in June 2010. In TSO, Kunnathunad it was not installed (August 2010). While in CRO,

⁶⁸ DVD, also known as Digital Video Disc or Digital Versatile Disc, is an optical disc storage media format capable of storing data size of 1 GB or more. Compact Disc can store data size of 700 MB or below. DVD writer/drive is a computer accessory for copying data to DVD.

Thiruvananthapuram North and TSO, Tirur backups were seen taken in pen drive⁶⁹, backups were not taken in DVD in any of the offices.

Though the data stored in central server is adequately backed up, the data stored in LANs in TSO/CROs cannot be overlooked especially in view of the fact that the department still relies on decentralised servers as pointed out in paragraph 1.4.13.1. The threat of data loss attracts attention in view of the delay in uploading of data to central server as pointed out in paragraph 1.4.20.5.

The Government stated (December 2010) that instructions have since been issued to ensure external backup in DVD media.

1.4.22 Conclusion

Though computerisation project started in 1995-96 and succeeded in issue of computerised ration cards to nearly 69 lakh households (May 2010) incurring an expenditure of above ` 1.4 crore, the department has not made a break through in achievement of the objectives of computerisation. In the absence of equipping department's human resource with the essentials of maintaining an information system and ensuring their continued service, the department could not exercise managerial controls and had to unduly depend on outsourced personnel with the consequences of unrestricted avoidable mistakes. Ineffective organisational and management controls, inadequate planning and designing of the system, improper exercise of internal controls, etc., stood in the way of its usefulness as a management information system.

1.4.23 Recommendations

- The information system should urgently be redesigned to meet the basic user requirements and data normalisation principles.
- Authorisation and validation of data should be given utmost priority. Completeness and correctness of data should be certified at appropriate levels.
- Information system security and password policies should be formulated and their compliance ensured.
- Immediate steps should be initiated to separate digital images from the primary tables, used for querying, with proper linking.
- Steps should be initiated to equip the system for online processing instead of presently followed batch processing through data porting from central server to individual servers and vice versa.
- Adequate training should be imparted to all levels of staff and their continued service should be ensured for the smooth continuity of the project.
- Management Information System (MIS) reports should be generated on the basis of real-time queries. Further, MIS reports on the entire management of public distribution system, like total allocation, lifting,

⁶⁹ Pen drive is a Universal Serial Bus (USB) flash drive consisting of a flash memory removable data storage device commonly used for easiness in data portability.

balance, distribution to ration depots, excess, shortage, etc., should be made available to top/middle management.

- Penalty for failure/delay in providing services should be included in AMC conditions.
- A suitable Business Continuity/Disaster management Plan should be formulated and implemented.

HEALTH AND FAMILY WELFARE DEPARTMENT

1.5 Computerisation in Regional Cancer Centre

Highlights

The Regional Cancer Centre, Thiruvananthapuram, a State Autonomous Body established in 1981, is a research institute providing facilities for cancer diagnosis, treatment, palliation and rehabilitation to the population of the State of Kerala and the adjoining parts of Tamil Nadu and Karnataka. Computerisation of the vital activities of the institution, which began in a small way in 1991, has evolved to Hospital Information System with the capability of providing telemedicine services. While a review on functioning of the computerisation project revealed commendable performance of computerised registration and Cancer Epidemiology and Clinical Research departments, it also brought to light various shortfalls/deficiencies, viz., ineffective organizational and management controls, inadequate planning at various levels, lack of proper monitoring mechanism during implementation, ineffective internal controls, etc. in other departments.

Lack of proper IT Planning and absence of IT Steering Committees led to isolated system development lacking focus in achieving the optimum results and underutilisation of software modules.

(Paragraph 1.5.7)

In the absence of User Requirement Specifications (URS) the extent to which the intended benefits of the computerisation were achieved could not be assessed.

(Paragraph 1.5.8.1)

The integrity of the system is at stake on account of data loss caused by deficiencies in system design.

(Paragraph 1.5.9.1)

Accounts of the institution over the years were not drawn up properly on account of system design deficiency.

(Paragraph 1.5.9.2)

The institution having the annual cash transaction above ` 40 crore is vulnerable to fraud on account of non-tallying of daily collection report.

(Paragraph 1.5.10.1 (iii))

Improper implementation of computerisation in nursing department resulted in ineligible payment of salary of ` 34.59 lakh.

(Paragraph 1.5.10.1 (v))

The institution did not have adequate information security and password policies.

(Paragraph 1.5.10.3(i) and 10.4(i))

Lack of controls resulted in incorrect data capture, ineligible credit and availing of leave, etc.

(Paragraph 1.5.11.1(iii)and (vi))

Costs of avoidable manpower were ` 16.78 lakh in medical records and ` 9.58 lakh in stores departments.

(Paragraph 1.5.11.2 (iv) and 1.5.10.1 (vii))

In the absence of offsite storage, the soft assets of the institution are at risk of irreparable loss.

(Paragraph 1.5.12 (ii))

1.5.1 Introduction

The Regional Cancer Centre (RCC), Thiruvananthapuram, an autonomous body, was established in 1981 by the Government of Kerala with the financial assistance from the Government of India also. It is a comprehensive cancer care centre catering to the population of the State of Kerala and the adjoining parts of Tamil Nadu and Karnataka. The objectives of the institution are to provide facilities of modern treatment for cancer, to evolve cancer control programme and to provide necessary facilities for teaching undergraduates, post graduates and paramedics. In addition to diagnosis and treatment of cancer, the institution undertakes ongoing research projects related to prevention and cure of cancer.

1.5.2 Organisational Structure

The Governing Body headed by the Chief Minister of the State is at the apex level. While the Executive Committee is headed by the Secretary to Government, Health and Family Welfare Department, the Director, RCC is the convener. There are 22 departments each functioning under a Head of the Department. The RCC has five peripheral nodal centres at Karunagapally, Kozhencherry, Kochi, Palakkad and Kannur.

1.5.3 Information System set-up

Computerisation began in the RCC in 1991 by computerising the activities of store, pharmacy, cytology lab, clinical laboratory and purchase departments. Capturing of clinical data of patients started during 1999-2000 followed by computerisation of the activities of Administration and Accounts departments. The institution has following Information systems:

Office Management System (OMS): Office Management System, an administration and accounting package, which began as an in-house package was later outsourced to M/s Arackal Digital Solutions Ltd. The vendor, who was a former employee of the institution developed and handed over the source code free of cost to the institution. OMS included payroll, leave and service records processing and financial accounting. The system has been operational since January 2002.

Hospital Information System (HIS): ‘OncoNet-Kerala’ was a research project on telemedicine initiated by C-DAC⁷⁰ in collaboration with the RCC and ISRO⁷¹. The Department of Information Technology, Ministry of Communication and Information Technology, Government of India accorded

⁷⁰ Centre for Development of Advanced Computing, formerly ER&DCI, Thiruvananthapuram, is a Scientific Society of the Department of Information Technology, Ministry of Communications & Information Technology, Government of India

⁷¹ The Indian Space Research Organisation (ISRO), is the primary body for space research under the control of the Government of India, and one of the leading space research organizations in the world

sanction for the project in September 2003. It envisaged to integrate all other functions of the hospital management and had a financial outlay of ` 2.35 crore. While ` 1.79 crore was grant-in-aid from Government of India, contribution by ISRO was ` 36 lakh and contribution by RCC was ` 20 lakh. Government of Kerala incurred ` 54.81 lakh towards the purchase of hardware and software during 1990-91 to 2008-09 in addition to the above. The project envisaged providing telemedicine services by establishing connectivity with five nodal centres of RCC located in various parts of Kerala utilising the expertise of the RCC in the field of oncology. As part of the project, C-DAC developed a Hospital Information System specifically by name 'TEJHAS'⁷², which has been put to use since January 2005.

The hardware includes five Xeon servers, eight P4 servers, 250 PCs, 80 thin clients, 110 printers, four IP cameras, six flat TVs, six Video conferencing systems, six V-SAT⁷³ and Sky IP⁷⁴ units, three telepathology/radiology, one router and 29 hubs/switches. The application server runs Oracle 10g database on Enterprise Linux 3.0.

1.5.4 Audit objectives

The objectives of the information system review were to assess the extent of achievement of the objectives of computerisation by ascertaining whether:

- Ø Effective organisational and management controls were in place to ensure safeguarding the business assets;
- Ø Adequate internal and system controls were in place to ensure the achievement of intended results;
- Ø Adequate security measures and business continuity planning were in place;
- Ø Basic attributes of data/information like confidentiality, integrity, availability, reliability, compliance, etc., are maintained and
- Ø The electronic system was successful in replacing the manual system.

1.5.5 Scope and Methodology

1.5.5.1 Scope of audit

We evaluated the implementation of information system packages like HIS and OMS, performance of electronic recording of attendance, functioning of telemedicine project 'OncoNet-Kerala', management of IT assets, adequacy of human resources and internal control measures.

1.5.5.2 Audit methodology

Audit was conducted during February – May 2010. An entry conference was held with the Director of RCC on 3 Feb 2010. The audit team visited various Departments at RCC, Thiruvananthapuram and three⁷⁵ out of five Nodal Centres of RCC for on the spot verification of the working of the system and held interview with end-users to assess the usefulness and user-friendliness of

⁷² Telemedicine Enabled Java Based Hospital Automation System

⁷³ A Very Small Aperture Terminal (VSAT) is a two-way satellite ground station or a stabilized maritime VSAT antenna with a dish antenna that is smaller than 3 metres. The majority of VSAT antennas range from 75 cm to 1.2 m

⁷⁴ The SkyIP terminal provides a satellite communications solution based on the Internet Protocol (IP)

⁷⁵ Karunagapally, Kochi and Palakkad

the software. Backup data in respect of clinical data, billing data and personnel data were analysed using CAATs⁷⁶. The review was sent to Government on 4 October 2010 and discussed in the exit conference on 22 October 2010.

1.5.5.3 Audit Criteria

Software Requirement Specification and Preliminary Design Document of Hospital Information System, FR & SR of Central Civil Services, Service Rules of the RCC and various administrative orders of the institution were relied upon.

1.5.6 Acknowledgement

We would like to place on record our appreciation on management of the institution by a team of dedicated clinicians, nursing staff and other personnel in providing quality service in diagnosis, prevention and cure of cancer. Management of computerised registration, performance of Cancer Epidemiology and Clinical Research department and outpatient clinic is praiseworthy. Clinicians are seen taking extra pain to consult nearly four times the number of patients expected of them. The telemedicine venture is found to be a pioneer step in catering to the population located in distant places. We would also like to place on record our sincere thanks for the cooperation extended by the Government of Kerala, the Director, other officers and staff, especially the IS department of the Regional Cancer Centre, Thiruvananthapuram.

Audit Findings

1.5.7 Management Direction and Planning

1.5.7.1 IT Planning

Information Technology planning provides a structured means of addressing the impact of technologies, including emerging technologies, on an organisation. Through the planning process, relevant technologies are identified and evaluated in the context of broader business goals and targets, on the basis of which the direction for the organisation can be established.

Absence of IT planning in the organization led to isolated system development lacking focus in achieving resource optimization. Hospital Information System (HIS) was not integrated with the financial and accounting software – Office Management System (OMS). The non-integration of these systems led to reconciliation issues, non-tallying of subsidiary accounts, duplication of work and underutilization of man and machine resources.

The Government stated (December 2010) that IT Plan would soon be formulated.

1.5.7.2 IT Steering and Monitoring Committees

IT Steering Committee would be responsible for the overall direction of IT. To be effective, the IT Steering Committee should draw its members from senior and middle management and all user departments within an organisation. Senior management's presence is significant since it gives the

⁷⁶ Computer Assisted Audit Techniques

decisions made by the committee due importance and also ensures that IT is business driven and not technology driven.

Absence of IT Steering Committee led to non-implementation and non-utilisation of modules in five⁷⁷ out of 22 departments lacking focus in achieving the optimum results. The absence of IT monitoring committee resulted in ineffective/partial implementation of computerisation in seven⁷⁸ out of 22 departments. We noticed that shift roster of nursing staff were not entered into system, consultation modules were not utilized, discharge summaries were not entered into system, results of various investigations were not made available online to clinicians during consultations, etc.

All these indicate need for better direction in implementation. It has also led to duplication of work, underutilisation of man and machine resources and making the system open to human errors.

The Government stated (December 2010) that the IT Steering Committee would soon be constituted.

1.5.8 Status of Documentation

1.5.8.1 User Requirement Specifications (URS) and System Requirement Specifications (SRS)

Before taking up the computerization projects, the institution had not prepared and documented the User Requirement Specifications (URS). The development team had not prepared the System Requirement Specifications (SRS) and User Manual in respect of OMS. In case of HIS, although SRS and System Design Document (SDD) were prepared as an obligatory prerequisite for applying for the grant, these were not formally accepted by the institution. User manual prepared for HIS was never printed. But no URS was prepared and documented in case of HIS as well. There was no signing off of the projects in both the cases. There was collaboration among C-DAC, RCC and the Vikram Sarabhai Space Centre (VSSC) for the Onconet-Kerala. However, the RCC did not enter into service level agreements/ memorandum of understanding (MoU) with the C-DAC and VSSC for upholding of its legal rights, maintenance and future support.

In the absence of URS, we could not assess as to what extent the expectations of the users and the intended benefits of these projects could be achieved.

The Government stated (December 2010) that proper documentation would be ensured in the second phase of the OncoNet project.

1.5.8.2 Lack of obtaining user requirements resulting in ineffective implementation of telemedicine project

Telemedicine is the ability to provide interactive healthcare utilizing modern technology and telecommunications. Basically, Telemedicine allows patients to consult physicians live over video for immediate care or capture video/still images and patient data are stored and sent to physicians for diagnosis and follow-up treatment at a later time. The prerequisite for an ideal telemedicine

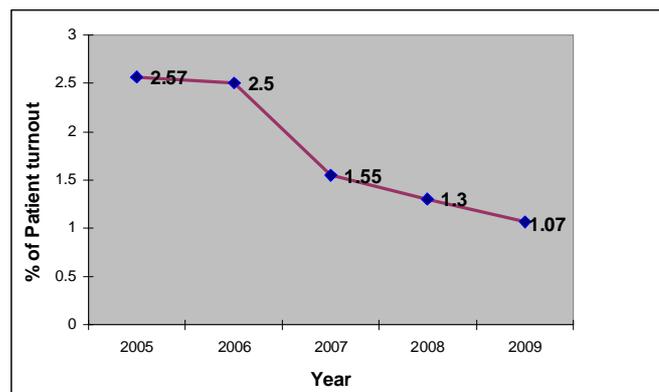
⁷⁷ Engineering, Consultation, Radiotherapy scheduling, Service ordering and scheduling, and Sterile service

⁷⁸ Nursing, Out Patient Clinics, Surgery, Stores, Purchase, Laboratory and Medical Records

system includes peripheral sophistication such as hand-held general exam camera, electronic stethoscope, dermatology camera, retinal camera, electronic electrocardiogram, etc. for enhancing precision and complexity in examination.

OncoNet-Kerala project envisaged connectivity between RCC and its nodal centres at different parts of Kerala⁷⁹. While the RCC supplied domain knowledge, C-DAC provided software support, and ISRO enabled communication facilities through satellite connectivity. The project enabled online consultations for patients belonging to distant areas with an expert clinician at RCC over live video. For this purpose, patients, either for early detection of cancer or follow up review after discharge, approached a Nodal Centre of RCC for online consultation with the clinicians in RCC.

In the absence of obtaining proper user requirements from medical practitioners, we noticed that the telemedicine equipments made available were merely video conferencing equipments without any peripheral devices attached to it. The bandwidth of the connectivity was found to be only 256 kbps, which did not give continuous and smooth stream of video. Frequently the video was found to be jerky, erratic and discontinuous on account of packet loss. We noticed that with the existing video quality the tele-consultation was not effective and that neither the clinicians nor the patients were happy in the online consultations. The clinicians stated that in the absence of peripheral devices and especially without a hand-held general exam camera and electronic stethoscope, detailed examination was not possible. The average percentage of patients opting tele-consultation was only 1.8 during the period from 2005 to 2009. The analysis of turnout of patients to the nodal centres during the period showed a declining trend as depicted below:



The Government stated (December 2010) that the institution has decided to switch over to KSWAN⁸⁰ having higher bandwidth

1.5.8.3 Change control management

Change control management is an integral part of any IT strategy, and is used to protect processes and systems. Change control within IT systems is a formal process used to ensure that changes to a product or system are introduced in a

⁷⁹ Karunagapally, Kozhencherry, Kochi, Palakkad and Kannur

⁸⁰ Kerala State Wide Area Network, is the core common network infrastructure initiated for e-Governance in Kerala

controlled and coordinated manner. We noticed the following lapses in this regard:

- There was no change control procedure to ensure that the software is not modified unauthorisedly.
- Changes to the source code were not documented, got verified at supervisory level and got approved at senior management level.
- Logs of such changes were not monitored, stored and critically analysed.
- The modified programs were not distinguished from the original by assigning any version numbers. The modified versions were put to use without any trial run.

The Government stated (December 2010) that change control management procedures could not be put to practice owing to time constraints.

1.5.9 Deficiencies in System Design and Development

1.5.9.1 Loss of records while saving to the database

Data analysis revealed that the amount stored at the column relating to cash in the table for storing net transactions was not matching with the corresponding values (product of quantity and price stored in the table relating to transaction details). The cash collected was stored in excess of ` 47,347 than the due amount in 230 instances.

The management stated (June 2010) that the program would correctly compute the due amount and print the bill, but owing to unexpected errors returned by external java-based programs used for printing, there was the possibility for data loss while saving to the database. Occasionally when such cases were pointed out by laboratory departments the database was modified through backend access. It exposed the system to the following issues.

- Risk of fraud in the case of uncontrolled backend access.
- Reduced integrity of the system.
- Reduced dependability of the System through record loss.
- Reduced usefulness to the management.

The Government stated (December 2010) that steps would be taken to rectify the drawbacks.

1.5.9.2 Design deficiencies leading to inaccurate passing of journal entries

HIS has the facility to generate a daily collection report, showing the entire receipts of the Institution and its remittances. As HIS and OMS were not integrated the figures generated in the HIS were manually entered into OMS.

We noticed that the credit and debit side of the statement did not tally on most of the days. The output of the HIS report were wrongly adjusted before entering to the OMS for setting off the discrepancies. While journalizing, the difference in amount was seen wrongly adjusted in different heads. e.g., the daily collection report of HIS for 19 February 2010 showed the total collection amount as ` 22,75,583.40 (Cr) and the payments/apportioning to various heads as ` 22,75,533.40 (Dr) having a difference of ` 50. In the journals

prepared, the amount of ₹ 50 was seen adjusted by reducing the amount collected under ‘Investigation and treatment charges (Dr)’ by an equal amount. While the credit side was higher than the debit side on most of the days, it was the other way round on some other days. This would mean excess credit of a day would be set off against the excess debit on another day. Without considering set off of plus or minus values, a tabulation of net differences in daily collection reports for the period from 2004-05 to 2009-10 worked out to ₹ 2,38,668.90 as indicated in **Table 1.14**.

Table 1.14: Details of differences in daily collection reports

Financial Year	Amount collected (₹)	Apportioning to accounting heads (₹)	Difference (₹)
2004-05	3,83,55,506.74	3,83,41,037.24	14,469.50
2005-06	27,69,06,970.35	27,69,76,036.85	69,066.50
2006-07	35,23,87,692.70	35,23,51,234.70	36,458.00
2007-08	42,69,03,163.56	42,68,47,544.64	55,618.92
2008-09	51,95,48,460.96	51,95,16,529.73	31,931.23
2009-10	60,58,93,360.04	60,59,24,484.79	31,124.75
		Total	2,38,668.90

The actual discrepancy figures would still be higher since the figures indicated represent net of debit and credit discrepancies. As the figures in the journals had no authenticity, it could not be construed that the accounts of the institution over the years were drawn up properly and, therefore, did not reflect the true and fair view. It was also observed that neither the internal auditor⁸¹ nor the statutory auditor had pointed out this mistake in their reports so far.

The Government stated (December 2010) that a suspense-head has since been opened to temporarily accommodate the differences. Earnest efforts would be initiated to solve the issue of non-tallying of figures. HIS and OMS would be integrated.

1.5.9.3 Post implementation review

A post implementation review (PIR) evaluates how the project was run and whether or not the goals have been accomplished. A PIR would bring to light the area of weaknesses, deficiencies, flaws, drawbacks, etc., based on which the management could take measures to improve the system so that the goals are achieved with limited resources.

But, no PIR was conducted by the management to assess the strengths and weaknesses of the system.

The Government stated (December 2010) that since the system continued to be under development, the PIR could not be conducted.

1.5.10 General Controls

1.5.10.1 Organisational and Management Controls

Organisational and management controls are the high level controls adopted by management to ensure that the computer systems function correctly and

⁸¹ The institution has chartered accountants as internal auditors and as statutory auditors.

that they are satisfying business objectives. We noticed that the controls put in place were not sufficient to ensure that the IT activities are adequately controlled.

(i) *Ineffective execution of management controls*

Success of any project depends on significant participation by top management. However, we noticed that management information system (MIS) reports for overall supervision, guidance, direction, regulation and control over the business activities of the institution were not obtained by the top management for analysis. Regular reports on important transactions such as exception reporting, individual deviant activities, major irregular and abnormal transactions, high value transactions, etc requiring the personal attention of the top management were also not obtained for execution of controls. We also noticed that the internal auditor was not monitoring system resources.

The Government stated (December 2010) that steps have since been initiated for better scrutiny by top management.

(ii) *Lack of MIS reports causing persistent irregularities in electronic recording of attendance*

The attendance of staff was recorded through electronic card punching. When the entry and exit are recorded by swiping the card on a day the system would treat this as proper punching. When either entry or exit is absent the system would mark it as a miss-punch. Our analysis found the cause for miss-punch by employees as either forgetting to bring/swipe the card or even deliberately not swiping the card.

Data analysis revealed that some of the officials were regular in miss-punching as shown below:

- There were 61 employees who had miss-punched on number of days ranging from 873 to 100 during the period 2005 to 2009
- One of the Administrative Officers (Head of Administration Department) was seen to have miss-punched on 246 days during his tenure of service in the RCC from 29 Jan 2009 to 9 Feb 2010.

Since no MIS reports were made available to the top management, these irregularities could not be brought to the attention of the Head of the Institution.

The Government stated (December 2010) that action would be initiated to solve these issues while introducing bio-metric system of punching.

(iii) *Lack of internal controls resulting in vulnerability of the system*

A reference is made in paragraph 1.5.9.2 to non-tallying of daily collection reports of HIS. Although the net differences (₹ 2.39 lakh) in credit and debit worked out was a small figure compared to the annual cash transaction of the institution (₹ 44.45 crore), its importance in the internal control is very high since it would make the system vulnerable to risk of fraud.

The Government stated (December 2010) that earnest efforts would be initiated to solve the issue of non-tallying of daily collection reports.

(iv) Improper mapping of business rules relating to attendance

In OM No.60/17/64-Ests (A) dated 04.08.1965, Ministry of Home Affairs, Government of India have directed that late attendance of employees not exceeding ten minutes are condoned on every working day. Late attendance upto an hour, on not more than two occasions in a month may be condoned. Late attendance (exceeding ten minutes) from every third occasion in a month attracts debiting of casual leave for half a day. Various State Governments have adopted this rationale and made provisions in their Rules and Regulations.

The same rationale was adopted in the institution, when the manual attendance register had been used. However, while mapping the business rules to the computerised environment, there was deviation in the business rules followed hitherto.

References are made in sub paragraphs 1.5.10.9 (ii) and (v) of this paragraph to recording of attendance through electronic media and the software package used for it. Late attendance in excess of first 180 minutes attracted casual leave for half a day, followed by debiting casual leave for half a day for the multiples of 90 minutes. Whereas in the SCTIMST⁸², Thiruvananthapuram, which was taken as a role model for computerisation of attendance by the RCC, every late attendance exceeding ten minutes on a day after condonation of the first 180 minutes, casual leave for half a day was debited.

We noticed that the deviation in the business rules generating undue benefits to employees was not authorized by the Governing Body/Executive Committee of the institution.

The Government stated (December 2010) that the deviation in business rules would be rectified. The action of the management would be ratified in the Executive Committee.

(v) Non-mapping of business rules resulting in mistakes in computation of loss of working hours

A reference is made in paragraph 1.5.10.1 (ii) to recording of attendance through electronic media. Software package (Savior) is used to capture the in-time, out-time and compute the duration of working hours of employees. The system has the provision to work out loss of working time (in minutes) on the basis of the details of shift roster entered. The default working hours are fed into the system as 9:00 AM to 4:30 PM. While late attendances up to 10 minutes are condoned everyday, early departure is wholly debited in the computation. In addition a total of 180 minutes including a maximum of 90 minutes on a day is condoned. Late attendance in excess of eligible period is made good by debiting leave. The Administration Department was to keep watch on loss of working hours.

Members of nursing staff are working in various shifts. The time period in shifts varies from 300 to 450 minutes, excluding night shift of 12 hours. There are 18 time slots⁸³ depending on the nature and location of duty. However, the

⁸² Sree Chitra Tirunal Institute of Medical Science & Technology, Thiruvananthapuram, a Central Autonomous Body under the Department of Science & Technology, Government of India

⁸³ E.g., (1) from 8:00 AM to 3:30 PM; (2) from 8:30 to 4:00 PM; (3) from 8:30 AM to 3:30 PM; (4) from 9:00 AM to 4:30 PM; (5) from 9:00 AM to 4:00 PM; etc.

shift roster for the nursing staff is not entered in the system. In its absence, the system cannot give proper analysis of the attendance of nursing staff.

The loss of working hours was stated to be monitored manually by the Nursing department for debiting leave. Since the manual computation was cumbersome and prone to errors, we entered the shift roster for November 2009 into data tables for the computation. Our analysis revealed that 38 employees had loss of working time in excess of 180 minutes in that month. But no leave was seen debited against these cases. E.g., Employee IDs 5208, 1254, 1090, 1091 and 1306 had loss of working time of 290, 274, 329, 216 and 231 minutes respectively. Ineligible payment as salary on account of non-debiting of leave worked out to ₹ 34.59 lakh during the period from January 2002 to August 2010.

The Government stated (December 2010) that steps have since been initiated to solve the issue.

(vi) *Lack of control through absentee statement*

Absentee statement is a time-tested internal control tool to monitor the absence and leave of employees. As a control measure Establishment Section generally fixes a date on which all the Departments/Sections are to furnish a statement of absentees, on the basis of which the pay and allowances are to be regulated.

Both the formal and non-formal leave accounts are computerised in the RCC. But, in the absence of provision for online submission of leave applications, employees submit manual leave application forms to the Heads of the Departments (HoDs) concerned, who transmit the same to the Establishment Section, sanctioning subject to eligibility.

A reference is made in paragraph 1.5.10.1 (ii) to recording of attendance through electronic media. However, no provision was enabled in the system to generate absentee statement. No date was fixed for watching receipt of absentee statement. In view of computerisation the system of manual absentee statement was also discontinued. In its absence, we observed recovery of salary paid in excess after even six months as the pay bill processing treats everyone as present by default and salary is paid without regard to the fact whether one was absent/ on leave without allowances/ on half pay leave.

The Government stated (December 2010) that steps have since been initiated to generate absentee statement and insist on watching of the absentee statement.

(vii) *Non-fixing of reorder level causing inability of the system for generation of purchase indent*

According to the System Requirement Specifications, purchase orders are to be issued on the basis of the reorder level fixed. We noticed that no VEN Analysis⁸⁴ has been done based on which the maximum and minimum quantity to be stored, the reorder level and the reorder quantity are to be fixed.

⁸⁴ Vital, Essential and Non-essential Analysis

The reorder level and reorder quantity would also depend on the lead time⁸⁵ and information from the past experience.

In the absence of fixing the reorder level and re-order quantity, purchase orders could not be generated through the system. The stock level and consumption of various items at the stores for the last three months were tabulated manually to prepare the monthly indents. We noticed that 40 per cent of labour is spent on this avoidable manual work. Cost of avoidable manpower worked out to ₹ 9.58 lakh during the period from January 2005 to August 2010.

1.5.10.2 Human resource management

Staff training and development are closely linked to human resource planning. It ensures that organisation has controls and procedures in place to reduce the risk of mistakes being made.

(i) Absence of training

Although the institution has been computerised since 1991, the employees were not trained adequately in the operation of the software. The absence of training had the following impacts:

- Modules in the software were either unutilized or underutilised as pointed out in paragraph 1.5.7.2.
- Unaware of the importance of the electronic resources and their relevance in the business, vital data relating to actual pay bills were replaced with wrong data as pointed out in paragraph 1.5.10.5(i).
- The end users were unable to demand for rectification of bugs and had to limp with manual processes.

The Government stated (December 2010) that steps would be initiated to impart adequate training to staff.

(ii) Absence of job rotation

Absence of training forced the institution to unduly depend on certain people. There are employees, who are never transferred to any other posts. For example, we noticed that billing counters are dependent on certain officials without a second line of employees. We also noticed that the pay bill preparation is solely dependent on a single official. Vacancy causing by the retirement or otherwise of such employees would jeopardise the business of the institution.

The Government stated (December 2010) that steps would be initiated for job rotation after imparting adequate training to staff.

1.5.10.3 Physical and Environmental Controls

(i) Lack of information security policy

Information security means protecting information and information systems from unauthorized access, use, disclosure, disruption, modification or destruction. We observed the following lapses arising from the lack of information security policy:

⁸⁵ The time lag since a user department makes an indent till the supply of the material/medicines

- No officer has been assigned with the responsibility of the IS security. Instructions pertaining to information system issues, including best IT practices and password policies were not seen circulated to the employees. Users were not seen made aware of the IS Security requirements on a periodical basis. No mechanism was seen for recording and reporting security incidents.
- There was no system to analyse audit trails available in the system, such as reviewing of logs maintained of individual activities, information on unsuccessful user login attempts, etc.
- The Management has not classified data based on its criticality and the officers concerned were not made responsible for ownership of data for ensuring data integrity.
- Exception reports were not reviewed periodically.

(ii) *Ineffective environmental control*

The objective of environmental controls is to prevent computer equipments and the information from environmental damage, caused by fire, water (either actual water or excess humidity), earthquakes, electrical power surges or power shortages.

While the server room is adequately protected from unauthorised access and environmental damages caused by water seepage and humidity, the likelihood of damages causing by fire is neglected. Not to speak of fire/smoke detection devices even when a fire extinguisher is not provided in the server room. The risk of fire is to be viewed vis-à-vis the fact that institution's entire data is confined to a single room.

The Government stated (December 2010) that fire fighting and detection devices would be installed in the server room.

1.5.10.4 *Logical Access Controls*

Logical access controls in the IT System are intended to protect computer resources against unauthorized access and are vital for proper information security and computer security.

(i) *Absence of password policy*

Lack of password policy would expose the system to the risk of unauthorized access and modification of data. We observed the following shortcomings arising from absence of password policy.

- Separate user names and passwords were not assigned to individual users. Periodical changes of passwords were not ensured.
- Though the application would be exited after 3 unsuccessful login attempts, it did not lock up on specified unsuccessful sign-in attempts exposing the system to the threat of permitting a miscreant to continue their cracking attempt any number of times.
- OMS passwords were stored without encryption. Though HIS passwords were encrypted, there was no restriction on passwords and user-ids being the same. Complex passwords were not enabled in the system.

- No instructions were issued on password policy specifying the structure and length of password, changing of passwords, secrecy to be maintained etc. The length of password was noticed to be as short as 3 characters. Users were not forced to change the initial passwords set by administrator.

(ii) *Non-assignment of individual user login-identification*

User accountability is ensured by proper identification of the users. However, we noticed that instead of providing individual user login-ids, the end users were forced to log into the system using group login-ids. One group login-id is used by a number of people working in a Department. For example, a group of employees assigned to three or four billing counters located in a billing kiosk named Bill1 use the same user-id 'Bill1'.

The Government stated (December 2010) that it has since been decided to assign individual login-ids.

(iii) *Non-capture of login-identification*

In order to circumvent the design deficiency of capturing individual login-ids, data entry forms were provided with a column for entering user's name. As the user had to enter his name in each transaction, it was time consuming, and also liable to misuse. The users can fill in junk characters like 'aaa', 'xx', etc. or leave the column blank.

Data analysis revealed that 85 percentage of records in a table relating to bill transactions were devoid of user-ids, 84 percentage of user credentials in another table for Cancer Care for Life did not match with the authorized users and in 51 percentage of records in another table on net transactions had null values in the field for storing user-ids.

As a result, the system is devoid of login information as to who entered a particular piece of data. This lapse would stand in the way for prevention against miscreant user activities and deprive the institution of a tool in prevention of frauds and mistakes.

The Government stated (December 2010) that the issue would be solved by assigning individual login-ids.

1.5.10.5 *Audit trail*

Audit trail is a chronological sequence of records, each of which contains evidence directly pertaining to and resulting from the execution of a business process or system function in addition to maintaining a record of user activity and other events that show the details of user and system activity.

(i) *Non-retention of basic data*

Any loss of data or unauthorized modification to the existing data is highly detrimental to business.

Data analysis showed that the storage of pay bill details in Office Management System (OMS) did not correspond to the office copy of pay bills. Two examples are shown in **Tables 1.15 and 1.16**.

Table 1.15: Data stored in the system (July 2008)

Name	BP	Spl Pay*	DA	HRA	CCA	TA
Shri Raveendran Nair R	12250	6125	8636	0	0	0
Shri Shaji J	7450	3725	5252	0	0	0

* In the absence of a field for Dearness Pay a field relating to Spl Pay was used to store DP

Table 1.16: Information available in the Office copy of Pay Bill (July 2008)

Name	BP	DP	DA	HRA	CCA	TA
Shri Raveendran Nair R	12250	6125	8636	2756	180	0
Shri Shaji J	7450	3725	5252	1676	180	200

The Government stated (December 2010) that the time constraints in implementation of pay revision orders had caused the issue.

(ii) *Non-retention of electronic and manual office copies of sales bills*

When a sales bill is generated the number of items sold is captured in a table for storing transaction details. Subsequently, if one of the items is cancelled the corresponding entry is made in the same record and the quantity is updated with the net quantity after the cancellation. The cancelled quantity is stored in another column of the same table.

Since these are two transactions: (1) for sale of items and (2) for cancellation of items, for proper audit trail, both the transactions should have been stored as such. Instead the record is updated based on the latest transaction resulting in loss of details in respect of the original one. As a result, in the case of a cancellation, the original bill is not retrievable. Since the manual office copy of the original bill is not printed and preserved, this deficiency leaves the system without any audit trail.

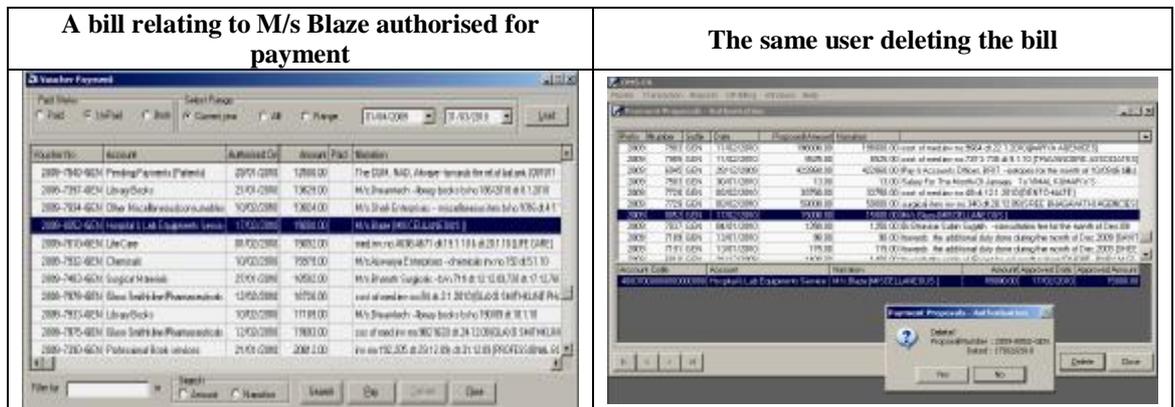
The Government stated (December 2010) that the issue would be solved at the time of modification of the package.

1.5.10.6 *Segregation of Duties*

Inadequate segregation of duties increases the risk of errors being made and remaining undetected, fraud and the adoption of inappropriate working practices.

The system provided a workflow automation involving the indent preparation, approval at various levels of officers viz, Purchase Officer, Accounts Officer, Controller of Finance, etc. It facilitated authorisation controls at various levels on the basis of segregation of duty.

We noticed that the entire process had been done manually and finally the whole operation was entered into the system by a single user with a user-id having rights for entry, approval, authorisation and deletion bypassing all the inbuilt controls. The following instance depicts deletion of an authorised payment by a single user having all the said rights.



We noticed that although the transactions were manually authorised at appropriate levels, the data entered in the system by a user has never been validated and approved at supervisory level. This involves not only the risk of deliberate fraud but also prone to mistakes being crept in the system affecting data integrity. Same is the case with passing of journal entries.

The Government stated (December 2010) that the work flow automation would effectively be put to use.

1.5.11 Application Controls

1.5.11.1 Input controls

Application controls include controls that help to ensure the proper authorisation, completeness, accuracy, and validity of transactions, maintenance, and other types of data input. Authorisation controls reduce the risk of wrong, fraudulent or irregular transactions. We observed the following shortcomings in input controls.

(i) Inaccuracies in master data

Master table is the most currently accurate and authoritative permanent or semi-permanent computerised record of information maintained over an extended period. We noticed following inaccuracies in master data:

(ii) Mistakes in coding of master tables

Coding facilitates the organization in retrieval, and interpretation of data so as to arrive at conclusions on the basis of that analysis.

We noticed that the institution did not follow any systematic coding pattern. E.g., in the two closely related master tables relating to items purchased and billing items, there were several instances of an item-id having two different descriptions. A few examples are given in **Table 1.17**:

Table 1.17:

Item-id	Table for purchase items	Table for billing items
BM001	Broom	Peripheral Blood Stemcell Supp
BP001	Beaker Polythene 1000ML	Breast Prothosis
BP002	Beaker Polythene 500ML	Breast Prothosis
BR001	Bradma Ribbon	Breast – Wide Excision
BS001	Brass Scissors	Bone – Bone Biopsy
CA001	Camera	Catheter-Sub Cleavian

Item-id	Table for purchase items	Table for billing items
OT002	S.S. Buyl 4 inch	Book-Questions On Ca
OT003	Tray With Lid 18x12 inch	Book On Cancer-Malayalam
PP001	Pastuer Pipette	Registration Fees
PP002	Polythine Sheets	Review Charges
RETRA	Retractors	Reimbursement Of Travel
SG001	Sponge	Sigmoidoscopy
VENTI	Post-Oper.Vent Cir W Coll Botl	Ventilator

We also noticed that all the items purchased are not coded in the table for billing items. In the absence of that, billing clerks had to use a lookup list to locate the item from the table relating to items purchased to process a bill. In many instances owing to non-uniformity in codings they had to make telephonic request to IS department to get a new code, while making the customer to wait at the counter.

The Government stated (December 2010) that action would be initiated to rectify the mistakes.

(iii) Capture of invalid information and non-capture of vital data

Data analysis revealed that the master table containing details of 2,062 employees had many mistakes some of which are shown below:

- 208 and 380 null values in the fields of date of birth and date of retirement respectively
- While the age of 528 employees were stored below 18 years (minimum required age for employment), 9 employees had future dates as their date of birth
- Retired employees whose status still active were 21
- Incorrect date of retirement, whose date of birth falls on 1st of the month were 61

Another master table containing details of 1,22,102 Cancer Care for Life (CCL) members included many mistakes, some of which are shown below:

- Duplicate registration numbers were 110
- 2,080 null values in the field for storing date of birth of CCL members

In 3,218 out of 62,414 non-cash payment cases, number and date of cheques were not captured in another table relating to CCL.

In physical verification of 58 initial records (Service Books) with the data captured in the system, we observed following errors:

- Nine mistakes in the field of date of birth
- In 57 cases the name of father/mother was either not captured or not matching with the information in the SBs
- In six cases Community/Caste was incorrect
- In 17 cases the spouse's names were not captured

Although the mistakes in OMS have never been rectified, the data validated and no supervisory control exercised, the updation to the service books has been dispensed with.

The Government stated (December 2010) that action would be initiated to rectify the mistakes.

(iv) *Duplication of data entry in master tables and other files*

References are made in paragraph 1.5.10.1 (ii) and 1.5.10.1(v) to recording of attendance through electronic media and the software package used for it. In the absence of integration of ‘Savior’ package with OMS, another master table was created in Savior package for storing of employee details, in which details of employees were re-entered. We noticed that none of the names in the employee tables in OMS and Savior match. There were mistakes in vital data like names, initials, gender, date of birth, etc. Even in the absence of integration, had the table been ported from OMS to Savior these mistakes would not have occurred and data entry time could have been saved.

A reference is made in paragraph 1.5.9.2 to non-integration of HIS and OMS. In its absence, the entries in the HIS daily collection report were to be manually entered into OMS. The re-entry of data would not only be prone to mistakes but also expose the system to the risk of fraud.

The Government stated (December 2010) that this issue would be solved by integration of HIS and OMS.

(v) *Lack of authorisation before and after data entry*

Before and after entering the data into the master tables, it has to be validated and authorized by the competent authorities. If the values in the master data are changed, it affects several transactions in the database and hence has a high risk.

However, we noticed that important data to be stored in the master tables of OMS such as computation of annual increments of employees is not verified and approved at peer/supervisory level before they were entered into the system. As the transaction files like monthly payroll are to be automated on the basis of the data stored in the master tables, such data would no more be subjected to human scrutiny. Hence any mistake in the master table would have far reaching consequences. The data once entered is never validated at peer or supervisory levels with proneness to mistakes and risk of fraud.

The Government stated (December 2010) that steps would be initiated for proper validation and authorisation at appropriate levels.

(vi) *Ineffective validity checks and system level authorisation*

The accuracy of data input to a system can be controlled by imposing computerised validity checks on the data presented to the system. System controls such as error correction procedure, reporting of abnormal values, control totals, etc., are some of the management tools that could prevent or detect errors likely to be crept during data entry. The management has not made use of such tools. Data analysis found the following inaccuracies and logical errors in the data stored in the system as shown below:

- While in three cases casual leave was credited in excess of 20 days in a year, in 1,589 records negative values were seen credited.
- In 21 cases earned leave was credited in excess of the eligible 30 days in a calendar year.

- While 20 employees availed of casual leave in excess of eligible (20) days in a calendar year, 227 employees availed of more Restricted Holidays than their eligibility (one day).

The Government stated (December 2010) that all the mistakes would be rectified and necessary validity checks incorporated.

1.5.11.2 Processing Controls

(i) Automation of processes

Automation is the method of operating or controlling a process by automatic means, as by electronic devices, reducing human intervention to a minimum. This would not only reduce waste of working hours, but also make the system free from errors and omissions.

(ii) Manual computation of annual increments

There is a master table for storing annual increments in the system. We noticed that instead of equipping the system with the provision to automate a procedure to compute and store the annual increments, the amounts were worked out manually every year and entered into the system. We also noticed that the manually computed figures were not scrutinized and accepted at supervisory level before entering into the system.

The Government stated (December 2010) that it has since been decided to automate computation of annual increments.

(iii) Non-automatic pay bill generation

The OMS could be equipped to generate payroll taking into account the number of employees on roll in a month, their attendance, the leave availed of by them, etc. grouped by various cadre controls. However, the payroll generation process involved avoidable manual intervention. E.g., Bills Department had to add employees from the master database to the payroll procedure one by one under manual scrutiny.

The excessive reliance on manual intervention exposes the system to avoidable human omissions and errors. Since retired employees are also present in the database of active employees, there is the risk of ineligible payment. As the payments are credited to their bank accounts such payments would be unnoticed.

The Government stated (December 2010) that proper action would be taken.

(iv) Avoidable manual work caused by non-automation

The Medical Records Department stores the case sheets of patients treated at RCC. The case sheets are issued to outpatient clinics on the basis of online indents made by the Review counters during fixing appointments for patients to consult the clinicians concerned. The department also enters ICD codes⁸⁶ into the system from the information available in the case sheets.

⁸⁶ The International Statistical Classification of Diseases and Related Health Problems (most commonly known by the abbreviation ICD) provides codes to classify diseases and a wide variety of signs, symptoms, abnormal findings, complaints, social circumstances and external causes of injury or disease.

The case sheets are preserved on the basis of their activeness. Case sheet not demanded for review during the preceding five years is considered as inactive. We noticed that sorting of inactive case sheets was done by going through each case sheet to ensure that they were not indented for review during the last five years. When a case sheet is found to be inactive, the details are scanned and stored in the system and the case sheet moved to the inactive storage location, where it would be retained only for five more years.

Since the process is computerised and the indents for case sheets are always done online, there is no point in manual checking of case sheets to compute their aging. Two-third of the working hours are set apart for this avoidable manual work. The laborious manual work could have been avoided by equipping the system to generate a report on aging. Cost of avoidable manpower worked out to ₹ 16.78 lakh during the period from January 2005 to August 2010.

We also observed that the case sheets relating to patients, who chose follow-up reviews at nodal centres⁸⁷ were marked as inactive and moved to inactive storage location, since they had not been indented. This would cause weeding out of active case sheets with the consequences of running into legal complications.

The Government stated (December 2010) that efforts would be initiated for discontinuance of manual work.

1.5.11.3 Output Controls

(i) Incorrect report generation

Front-end analysis of HIS revealed that when a report on the list of expired items was generated, items which were not expired and items not in stock were also shown. It was noticed that when the last lot of items is issued to a Department and if some of them are returned by that department, the item is accounted in the expired list irrespective of whether the items are expired or not. However, if some lots were left with the Stores at the time of return, this would not happen.

The Government stated (December 2010) that there were no drawbacks because, when an item returned to Store it might be an expired or a defective item and hence rightly shown in the expired list. However, we are of the view that unused medicines, not necessarily defective, are generally returned to Stores, in every hospital. It is also worth mentioning that defective items should be displayed under defective list and not under expired list.

(ii) Non-customer-friendly bill format

Copy of a bill cum receipt⁸⁸ issued from the institution for collection of payment towards investigation charges is shown below:

⁸⁷ In the case of follow-up reviews at Nodal Centres, case sheets are not indented. Instead extract of relevant information contained in the case sheets are made available to clinicians.

⁸⁸ Identity of the patient is concealed to conform to medical ethics

REGIONAL CANCER CENTRE							
Thiruvananthapuram, Kerala, India							
www.rccm.org							
Tel: 9447561 2622561 262545							
Dusse: 111111							
Patient No. [REDACTED]							
Name & Address [REDACTED]							
No.	Item	Description	Rate	Qty.	Amount	Remarks	
1	EB011	R X V	200.00	1	200.00		
2	EB012	HBSAG	100.00	1	100.00		
3	CLO03	BIOCHEMISTRY -- SODI	100.00	1	100.00		
4	CLO04	BIOCHEMISTRY -- BICPT	100.00	1	100.00		
5	CLO11	L C K	100.00	1	100.00		
6	CLO08	BLOOD UREA	50.00	1	50.00		
7	CLO37	SERUM CREATININE	50.00	1	50.00		
8	CLO40	URIC ACID	50.00	1	50.00		
9	CLO41	BILIRUBIN TOTAL	50.00	1	50.00		
10	CLO47	HA+ SHD K+	50.00	1	50.00		
11	CLO50	RANDOM / PT SUGAR	50.00	1	50.00		
12	CLO03	CALCIUM	100.00	1	100.00		
Dr. Cash : 360.00					Total	360.00	
					Discount	870.00	
					Net	360.00	
For Controller of Finance							

It goes without saying that customer-friendliness demands that the information given in a customer bill should easily be understood by the customer. It would make sense and more cognizable to the customer if the total amount is the sum of individual amounts (1,030) and the net amount is the total amount deducted by the discount amount (1,030 – 670). This is the practice followed everywhere. But in the instant case, the relevance of the value shown as the total amount (360) is not sensible. Verification of the output/printout by the customer and pointing out discrepancies, if any, is one of the data validation controls successfully practiced in any online environment. Hence the above bill format not only deprives the right of a customer for a lucid receipt of his payment, but it also stands in the way of one of the input controls that could be effectively exercised.

The Government stated (December 2010) that the bill format would be modified.

1.5.12 Business Continuity Planning and Disaster Recovery Planning

Business continuity planning (BCP) is planning which identifies the organization's exposure to internal and external threats and synthesizes hard and soft assets to provide effective prevention and recovery for the organization while maintaining competitive advantage and value system integrity.

(i) Absence of external data backup

RCC faces risk of data loss since backups are not taken in any of the external media. Backup of one server is mirrored in another server, a scheduled backup is also stored in a server. In the absence of external backup unforeseen threats such as electrical power surges, lightning, gutting in fire, theft or deliberate causing of physical damages, etc., would cause irreparable damages to the soft assets of the institution.

The Government stated (December 2010) that steps would be initiated to implement external online data backup in the new building being built.

(ii) Absence of offsite storage of backup

All the servers are located in a single room. As backups are not stored externally, evidently there is no question of offsite storage. Voluminous data was the reason attributed for absence of external and offsite storage of backup. But since in the present scenario, storage media have become relatively cheaper and external portable hard disks of 500 GB or above is very common, there is no merit in the argument of the institution on voluminous data. The Government of Kerala is providing data backup facility in the State Data Centre. However, the institution has not explored the viability of such a remote storage of backup.

The Government stated (December 2010) that action would be initiated to maintain an online backup at the State Data Centre.

(iii) Absence of disaster recovery planning

Disaster recovery is the process, policies and procedures related to preparing for recovery or continuation of technology infrastructure critical to an organization after a natural or human-induced disaster. Practice drills should be conducted periodically to determine how effective the plan is and to determine what changes may be necessary. System security drill is a method in case of an emergency like fire, to measure the reasonable length of time it would take to force all the users to log off from the network system, to safely shut down the servers and to shift the hard disks to a secured place. The risk of fire damage can be reduced by the provision of fire detection and fire fighting equipments.

Since the institution has no external backup, no offsite storage of backups, no remote backup servers, etc, the need for disaster recovery planning is of utmost importance. However, we noticed the following in this regard:

- Disaster management plan is not formulated,
- Disaster management committee is not constituted,
- Data recovery practice drill has never been conducted and
- Fire drill and system security drills have never been conducted

It is also worth mentioning that the institution could not meet the requirement of setting up a parallel system for online testing of front-end tools by us. The entire business of the institution was adversely affected for more than three days, when a server crash occurred in 2007. These vindicate the absence of disaster recovery planning and reinforces its immediate requirement.

The Government stated (December 2010) that action would be initiated for formulating disaster recovery planning.

(iv) Malfunctioning of communication equipments causing disruption to business

The communication facility available for telemedicine at Nodal Centre, Karunagapally to RCC is only through V-SAT. In Ernakulam, Kozhencherry,

Palakkad and Kannur KSWAN⁸⁹ and ISDN⁹⁰ connections are available additionally. We noticed that the satellite communication equipments (V-SAT antenna and Sky IP terminal) were non-functional for more than six months at Karunagapally (May 2010). Disruptions of connectivity were a regular phenomenon in three out of five nodal centres visited. Since no MoU was signed with the other two participating agencies, RCC could not effectively achieve the benefits of telemedicine project.

The Government stated (December 2010) that signing of MoU would be ensured in the second phase of the OncoNet project.

(v) Lack of control over AMC provider

According to the terms of Annual Maintenance Contract (AMC) entered into with M/s PCS Technology Ltd., the customer was to keep record of machine failure including the nature of failure, date and time of booking the complaint, call completion and the total down time. The fault register revealed that there were 129 instances of hardware malfunctioning recorded during the period from 22 December 2008 to 17 February 2010. However, there was no column to mark the date of completion of the service call. Fault registers were not maintained during the period up to 21 December 2008.

The Government stated (December 2010) that steps have since been initiated for proper maintenance of fault register.

(vi) Non-levy of penalty from the AMC provider

The service level agreement (SLA) stipulated that the maximum permissible downtime would be 48 hours in a quarter excluding holidays. Response and completion time was four hours and 12 hours respectively. Penalty for completing the calls after the stipulated time was five *per cent* of quarterly AMC charges of the equipment in respect of servers and two *per cent* in respect of desktops/clients. Further the vendor was bound to ensure an availability of 98 *per cent* for all computer systems and peripherals. However, the fault register revealed that the exact time of occurrence of faults and time of rectification were not noted in any of the cases. In the absence of such data, it was not possible to calculate the downtime and invoke penal provisions of the SLA.

We also noticed that 30 *per cent* of entries did not contain the date of attending the service call. From the sparse data available, delay in attending service call ranged from three to 18 days. However, no penal provisions were invoked against the vendor.

The Government stated (December 2010) that the conditions would strictly be followed in future.

⁸⁹ Kerala State Wide Area Network (KSWAN) is envisaged to function as the core common network infrastructure for e-Governance

⁹⁰ Integrated Services Digital Network (ISDN) is a set of communications standards for simultaneous digital transmission of voice, video, data, and other network services over the traditional circuits of the public switched telephone network

1.5.13 Conclusion

Though computerisation project started in 1991 and evolved into a Hospital Informaion System by 2005 capable of providing telemedicine facilities incurring an expenditure of above ` 2.35 crore, other than partially computerising some of the activities, the institution is yet to make use of full fledged computerisation. Ineffective organisational and management controls, inadequate planning, improper exercise of internal controls, etc., resulted in a non-reliable system incapable of providing reasonable assurance to the management.

1.5.14 Recommendations

- Involvement of top management should be ensured by constitution of IT Steering and Monitoring Committees.
- The information system should urgently be subjected to software audit review to detect its bugs such as data loss so as to ensure reasonable assurance to the management.
- Immediate steps should be initiated to generate accurate reports on daily receipts and remittances so as to reduce the risk of fraud.
- The telemedicine facility should be made effective by introduction of peripheral sophistication and faster telecommunication among the nodal centres.
- MoU should be signed with participating agencies in telemedicine projects to ensure non-interrupted business.
- Information system security and password policies should be formulated and their compliance ensured.
- Authorisation and validation of data should be given utmost priority. Completeness and correctness of data should be certified at appropriate levels.
- A post implementation review should be conducted to identify areas of weaknesses and deficiencies.
- Rules relating to monitoring of attendance should be reframed in the rationale followed by Central and State Governments and approval of the Governing Body obtained.
- Shift roster of nursing department should urgently be captured into the system and loss of working hours computed through the system.
- A suitable Business Continuity/Disaster management Plan should be formulated and implemented.