

## CHAPTER VII: MINISTRY OF EARTH SCIENCES

### 7.1 Non-achievement of the objectives of modernising the Accounting and Personnel Management functions

**Vendor driven purchase by India Meteorological Department and lack of adoption of a standard methodology for acquisition and implementation of a computerised system like assessment of user requirements, system requirement specification, system design description, acceptance testing coupled with lax monitoring led to non-achievement of the objectives of computerisation despite expenditure of Rs.72.88 lakh.**

India Meteorological Department (IMD) planned (August 2002) for development of an Oracle ERP<sup>1</sup> based IT system with a view to modernise the system of accounting and minimising the errors arising out of manual working and to automate the operations of personnel management. IMD procured the software (January 2004) from M/s Oracle Corporation through NCCF<sup>2</sup> at a cost of Rs.47.45 lakh and procured compatible hardware (April 2004) at a further cost of Rs.25.43 lakh from M/s Actech information System Ltd, also through NCCF. The hardware was installed in August 2004. The software was to be customised for IMD in respect of ERP modules relating to accounting and personnel management. However, the software modules were demonstrated by M/s Oracle Corporation without customisation in May 2005. The system as envisaged by IMD in 2002 was not operational (December 2007) despite procuring the system software and hardware (ERP software & Sun Solaris Server) at a cost of Rs.72.88 lakh because of following deficiencies which were noticed in the process of acquisition and implementation of the system:

(i) **User requirement specification:** The need for a new IT system requires analysis before acquisition to ensure that business requirements are satisfied by new system. The URS, which is a detailed study of the requirements to be met by software, should have been the starting point for negotiations with vendors. However, IMD, without evaluating alternative solutions and without detailed analysis of its own requirements, requested M/s Oracle Corporation to present their solutions for IMD. M/s Oracle Corporation proposed a web-enabled solution for managing Establishment/General Section Services in September 2002. As this proposed solution was completely a

<sup>1</sup> ERP (Enterprise Resource Planning) solution – A comprehensive package which provides a complete solution for the IT requirements of an organisation. Typically, such a solution covers Personnel and HR, Finance and Accounts (including Accounts Payable, Accounts Receivable and Fixed Assets), Purchasing and Inventory etc. Popular ERP solutions are available from SAP, Oracle, PeopleSoft, etc.

<sup>2</sup> National Consumer Co-operative Federation

suggestion of vendor without the active involvement of IMD in defining and specifying its organisational needs, little progress could be achieved despite lapse of five years. IMD failed to realise initially that Oracle ERP modules were only generic software products and would need further customisation to match the organisational needs of IMD. Though the software was purchased in January 2004, partial customisation could take place only in 2007 after a considerable delay resulting into only one module i.e. HR module relating to payroll and human resources management being made ready to a limited extent. Incidentally, details of only 51 employees were planned to be entered into the master database of this module as of November 2007.

It was further observed in audit that the requirement specification submitted by M/s Oracle Corporation suggested the license requirements for 500 users for Human resources module. IMD finally procured 1200 user licenses for Human resources. There were no reasons on record to justify the decision about proposed number of users of the system.

(ii) **Lack of procedures for user acceptance testing:** Against the initial objective of computerisation of accounting and HR functions, only one module relating to personnel and payroll have been partially developed till June 2007. Since IMD do not have a documented formal plan for user acceptance testing of any customised ERP modules, this may result into further delays.

(iii) **Lack of Monitoring:** IMD was expected to monitor the process of acquisition and implementation of the computerised solution to ensure that the computerised solution would meet the intended objectives. However, IMD failed to coordinate various activities. Lack of monitoring was evident from the following facts:

- The software initially supplied by M/s Oracle Corporation was for windows OS platform whereas the hardware platform procured was Sun Server V440. This also delayed the whole process of computerisation as supply of compatible software took additional time.
- As per terms & condition of purchase order, the vendor was to supply and install the complete system at IMD site. IMD requested M/s Oracle Corporation in September 2004 to install the software. However, the agency refused to communicate directly since order was not placed on them directly and were routed through NCCF. IMD approached NCCF only in March 2005 i.e. after more than one year of the purchase, requesting it to intervene in the matter to get the software installed. After protracted correspondence between IMD, NCCF and M/s Oracle Corporation, the software was partially cutomised for HR and Pay Roll modules (excluding Oracle Financials) in July 2007.

- Annual Technical Support (ATS) arrangement from M/s Oracle Corporation for the software which was valid for one year after purchase of licenses could not be utilised as the whole endeavor of developing the system got delayed. ATS support in the absence of an operational system was not renewed exposing to the risks of non availability of support for upgradation of software licenses and critical patches at a later date.
- It was also noticed that as per user requirements specifications submitted by M/s Oracle Corporation, the requirements were assessed for 1800 Gazetted officers, 4649 Group B and C across the country besides other requirements. However, it was noticed during a follow up audit (December 2007) that the target was revised and IMD had a target of 1200 employees only for their details to be populated in the master tables up to February 2008, which is only 18.60 *per cent* of the requirement projected in the URS. Also, IMD planned to populate the details of only 51 employees till the end of November 2007. As such, in the absence of complete data of employees, the HR and payroll modules were not operational (December 2007).
- There were no immediate future plans for the accounting module.

Thus, though IMD incurred expenditure of Rs.72.88 lakh (including pending claims of Rs.5.60 lakh and Rs.25.43 lakh towards supply of software and hardware), the stated objectives of computerising the accounting and personnel management functions were not achieved.

## **7.2 Avoidable expenditure on interest**

**Failure of India Meteorological Department to ensure timely payment of premium towards purchase of land and ground rent resulted in avoidable expenditure of penal interest amounting to Rs.55.04 lakh.**

India Meteorological Department (IMD) accorded sanction for the purchase of land for office and residential building in Chandigarh for Meteorological Centre, Chandigarh. The sanction indicated that a part of the earnest money was to be paid to the Chandigarh Administration by the Chandigarh Central Division of Central Public Works Department (CPWD). Payment towards ground rent was to be made directly by IMD from their annual sanctioned budget grant.

The Estate Office, Chandigarh allotted two plots measuring 4757.21 sq. yds. for construction of office building and 2190 sq. yds. for construction of residential building in March 1999 and May 1999 at a premium of Rs.3.43 crore and Rs.1.14 crore respectively. As per the allotment letter, after adjusting the initial payment of Rs.86.60 lakh and Rs.28.44 lakh, the balance payment of Rs.2.56 crore and Rs.85.44 lakh for office and residential land

respectively, could be made either in lump sum within 30 days of the issue of allotment letter, or in three equal annual installments together with interest of 10 *per cent* per annum. Further, ground rent amounting to Rs.8.56 lakh for office land and Rs.2.85 lakh for residential land was also to be paid annually. In case of failure to pay the balance premium or ground rent in time, interest at the rate of 24 *per cent* per annum was leviable for the period of delay.

It was observed in audit that:

- **Delay in release of installments of premium:** IMD requested CPWD in February 1999 to make the balance payment of premium in time. However, IMD did not ensure availability of sufficient funds with CPWD for the purpose and CPWD did not make the payment of premium to the Estate office within the stipulated period of 30 days. The payments were made in five installments from July 1999 to August 2000. Consequently, Chandigarh Administration raised a demand for payment of penal interest. IMD then requested CPWD to make the payment of penal interest to the Chandigarh Administration. CPWD refused to make the payment towards interest in August 2006 stating that the client department was responsible for arranging adequate budget allocations for the works. This resulted in liability of Rs.47.30 lakh as penal interest which was attributable to IMD.
- **Delay in payment of Ground Rent:** The yearly ground rent of the land for office and residential land, which was required to be paid by IMD from its own budget, was also paid by IMD during 2000-2006 with a delay ranging from 31 to 307 days. Due to delay in payment of ground rent, Chandigarh Administration raised a demand of Rs.7.74 lakh as interest for late payment of yearly ground rent.

IMD made the payment of Rs.55.04 lakh towards penal interest on account of delays in payment of premium and ground rent in September 2006 out of its own budget.

IMD stated in June 2007 that the payment for cost of land was made through CPWD and allocation of funds was made by Director General (Works) directly to CPWD and not IMD. The reply of IMD was not tenable as IMD was the client department and had to arrange funds for its works.

Regarding delayed payment of ground rent towards office and residential plots, IMD stated in June 2007 that the payments were due in April and May every year, but due to delay in receipt of funds, these could not be made in time. It further stated that from 2007 the ground rent was being paid in March itself to avoid penal interest.

Thus, failure of IMD to ensure the availability of funds resulted in avoidable payment of penal interest amounting to Rs.55.04 lakh.

### **7.3 Unfruitful expenditure on in-house projects in National Institute of Ocean Technology**

**National Institute of Ocean Technology undertakes in-house projects to develop technology in the field of ocean science and technology and to commercialise the designs, mechanical instruments and other inventions resulting from Institute's activities. During 2001-02 to 2005-06, it undertook eight in-house projects; one project involving expenditure of Rs.60.82 crore failed due to poor project planning and deficient implementation. In another four projects, involving expenditure of Rs.7.21 crore, technologies developed could not be commercialised due to various reasons like taking up the project without market survey, lack of industry participation right from initiation, lack of demand due to technology developed not being cost effective.**

#### **7.3.1 Introduction**

National Institute of Ocean Technology (NIOT) Chennai, an autonomous Institute under Ministry of Earth Sciences (MoES) is involved in development of technologies in the field of ocean science and technology. The main activities of NIOT include deep seabed mining, ocean energy, marine instrumentation, material development, oceanic data collecting devices/observation systems, research & development of ocean related technology projects sponsored by the industry, development of required technologies for the management of coastal zone and islands of the country and patenting and commercialisation of the designs/instruments/other inventions resulting from Institute's activities. NIOT is headed by a Director assisted by administration, executive and core technology groups. Research Advisory Committee provides guidelines on research and developmental activities of the Institute and reports to Governing Council chaired by the Secretary, MoES.

NIOT has been undertaking R&D activities to meet the demand for energy and fresh water, especially in the coastal areas. Several in-house projects for generation of power and fresh water from the oceans have been taken up by NIOT, which are funded by MoES.

NIOT had taken up eight in-house technology development projects during 2001-02 to 2005-06, of which six projects costing Rs.89.19 crore have been examined. Audit examination disclosed that one project involving Rs.60.82 crore failed to give desired results due to poor planning and deficient project management. In another four projects, involving expenditure of Rs.7.21 crore, technologies developed could not be commercialised due to various reasons like taking up the project without market survey, lack of industry participation right from initiation, lack of demand, lack of adequate efforts to transfer the technologies etc. One demonstration project relating to "offshore barge

mounted desalination plant” was successfully demonstrated. Audit findings on these projects are discussed in the succeeding paragraphs.

### **7.3.2 Failure of project on generation of power from ocean thermal energy**

NIOT initiated a 1 MW pilot technology demonstration project entitled “Ocean Thermal Energy Conversion” (OTEC) at a cost of Rs.35.25 crore in June 1998, scheduled for completion by June 2000. The principle of OTEC is the utilisation of the temperature difference between warm surface sea water and cold deep sea water at about 1000 metre depth for generation of electrical energy. The objectives of the project were to set up a pilot OTEC plant off the Indian coast, carry out performance tests for generation of power from thermal energy and to establish the techno-economic feasibility of large plants. The project envisaged mooring of a floating barge on a single point mooring at a water depth of 1200 metres and the cold water intake pipe made of 1 metre diameter pipe of 1000 metre length forming part of the mooring system.

NIOT made two attempts for deployment of cold water pipe in February 2001 and February/March 2003 respectively but both resulted in failure. These failures led to the first revision of project cost from Rs.35.25 crore to Rs.74.97 crore in January 2004. After two failures, NIOT again decided to implement the project with simple and more reliable alternative configuration and with the provision of conducting trial before venturing into final deployment. Due to this, the cost was revised for the second time of Rs.83.49 crore in September 2004. However, Ministry of Finance in August 2005 turned down the proposal, with instruction to wind up the project. The project was shelved after spending Rs.60.82 crore.

It was observed in audit that NIOT did not ensure the expertise of the contractors who were to undertake deployment of cold water pipe and the existence of infrastructure required for deployment like vessels with Global Positioning System, winch, etc. NIOT acknowledged this fact while proposing a new vessel in April 2003 stating that non-availability of such vessel led to failure of the deployment of pipeline, ultimately resulting in non-achievement of deployment of pipelines in the OTEC project.

MoES, while agreeing that the failures in OTEC demonstration were due to lack of experience of NIOT as well as the Indian contractors in such offshore activity, stated that it recently deployed the pipe at 700 metres water depth as part of another project relating to desalination.

Thus, poor planning and deficient project management rendered the entire expenditure of Rs.60.82 crore unfruitful besides non achievement of the stated objectives of generation of power from ocean thermal energy.

### **7.3.3 Non-commercialisation of Technology**

Scrutiny showed that four out of six in-house projects involving an expenditure of Rs.7.21 crore could not be commercialised. These are discussed in the succeeding paragraphs:

#### **7.3.3.1 Desalination Technology**

A project titled “Establishment of Low Temperature Thermal Desalination (LTTD) plant at Kavaratti in Lakshadweep” was taken up at a cost of Rs.4.95 crore in July 2004 and was scheduled for completion by June 2006. An expenditure of Rs.4.91 crore was incurred for establishing the LTTD plant during 2004-06 in Kavaratti.

As per the Governing Council’s decision in November 2004 to promote commercialisation of technology, NIOT entered into a Memorandum of Understanding (MoU) with Indian Farmer’s Fertilisers Cooperative Limited (IFFCO) in January 2005. According to this MoU, NIOT was to be the principal holder of the developed technology, and NIOT and IFFCO were to work together in executing the technology demonstration-cum-utility project and, thereafter, in exploiting the developed technology. IFFCO did not involve itself in the project, although there was a specific mention in the MoU that they would work together in setting up the plant.

NIOT held a meeting with 14 entrepreneurs in June 2005 to impress upon them to adopt the technology, but no entrepreneur came forward. NIOT conducted another meeting in May 2007, in which, even though 19 entrepreneurs participated, none of them came forward to adopt the technology. Thus, there was lack of interest on the part of industries to the technology developed by NIOT. As a result, it was not commercialised even after two years of the decision taken by Governing Council.

MoES agreed to the fact that IFFCO did not show much interest later in the technology which may be due to NIOT’s upcoming project for demonstration desalination plant. The reply was not tenable as the technology developed did not evoke any positive response from entrepreneurs and NIOT could not find any buyers for the developed technology for its successful commercialisation. Thus the objective of commercialisation of ‘low temperature thermal desalination’ technology remained unachieved rendering the expenditure of Rs.4.91 crore largely unfruitful.

#### **7.3.3.2 Demonstration Plant utilising the power generated from Wave Energy Plant**

Under the sponsorship of MoES, a wave energy plant was set up by Indian Institute of Technology, Chennai in 1990 for studying the performance of various turbines for extraction of electrical energy. NIOT took over the project in 1995 and continued with the research. Governing Council in January 2001

instructed NIOT to transfer the facility to Government of Kerala or any other interested institutions in view of very less research activity happening in the facility, after the successful commissioning of the plant.

It was decided to install a small capacity desalination plant using the power generated from the “wave energy plant” to produce fresh water and supply it to the village community. The project was to be taken up as an in-house project and a “Reverse Osmosis Desalination Plant” costing Rs.22.25 lakh which was purchased in August 2000 was linked to the “wave energy plant” in June 2003. The wave powered desalination system was commissioned successfully in June 2003 and the fresh water generated by this project was distributed to the local village community.

Kerala Government showed some interest to take over the plant in 2004 but demanded an amount of Rs.10 lakh for maintenance of plant in the first year of taking over and Rs.5 lakh for next two years towards maintenance and upkeep of the plant. MoES, however, instructed NIOT in December 2004 not to bear any expenditure after the transfer of the plant and, therefore, the plant was not transferred. NIOT also did not approach other institutions and, as a result, it continued to maintain the plant incurring Rs.10 lakh towards maintenance expenditure, though providing potable water is not the mandate of the Institute.

MoES replied that since the research work was complete and the plant was not economical due to unavailability of sustained wave around its coasts, it was taking steps to close the project, as it had completed the objective of the approved scheme. The reply needs to be viewed in the light of the fact that NIOT was incurring expenditure on the activity for more than four years which was not economical.

### **7.3.3.3 Lobster Fattening Technology**

NIOT undertook a project titled “lobster fattening technology” under which technology was developed after incurring expenditure of Rs.1.20 crore. Governing Council, in January 2001, suggested attempting transfer of technology through joint venture capital scheme, so that selected entrepreneurs become partners of the fattening programme and the success/failure of the programme was shared by NIOT and the entrepreneurs. NIOT identified two entrepreneurs through advertisement, but after showing initial inclination, they withdrew and MoU could not be entered into with them. NIOT also did not take any steps to identify alternative buyers for technology transfer which would result in revenue, through technology transfer fee and royalty. Thus, even after six years of Governing Council’s instructions, the technology remains to be commercialised.

NIOT, in March 2007, accepted that the response of the entrepreneurs was poor and in June 2007 replied that the technology was welcomed by international organisations and State Governments and that commercialisation



was not far off. MoES stated in December 2007, that while NIOT explored possibilities of commercialisation, it was primarily a societal programme, meant for transfer of technology to the local fishermen community, which had taken place successfully. MoES also stated that NIOT/Ministry is now taking steps to popularise the technology among fishermen community. The reply of MoES is not tenable since NIOT itself proposed to implement transfer of this technology in two parts viz., one to entrepreneurs for commercialisation and the other for fishermen community, which was duly approved by Governing Council. Thus the objective of commercialisation of the technology was not achieved.

#### 7.3.3.4 Marine Instruments

NIOT, over a period of time, developed following acoustic instruments under Marine Instrumentation Mission.

Sl No.	Name of the Instruments	Duration of Development	Cost of Development
1	Acoustic Tide Gauge	5 years	35.00 lakh
2	Marker Lamp Version 1 & 2	1 year/6 months	3.00 lakh
3	Acoustic Release System	1 year	10.00 lakh
4	Integrated Underwater Survey system	4 years	40.00 lakh
		<b>Total</b>	<b>88.00 lakh</b>

To commercialise the above instruments, NIOT conducted a market survey to find out potential manufacturers. It identified M/s Bharat Electronics Limited (BEL) as the only qualified manufacturer and MOU was signed in June 2002 as per which BEL was required to produce and market the products developed. The agreement was not extended beyond June 2004 since BEL declined to invest on the instruments for which there was no sizeable market. As an alternative measure, NIOT invited tenders for locating suitable entrepreneurs. Only two manufacturers attended the pre-bid meeting but did not evince any interest to take up the technology, as instruments developed did not have enough demand in the market. Thus, the instruments developed at a total cost of Rs.88.00 lakh did not get commercialised.

NIOT in March 2007 agreed that the attempt made to commercialise the technologies did not materialise since even qualified industries were not ready to take them up as a product which could be commercialised. Again in June 2007, NIOT stated that prior to in-house development, NIOT imported these items at exorbitant cost, which was avoided, and hence development of these items has been justified. MoES stated in December 2007 that commercialisation was never the objective of the project and project ended at successful development of instrumentation for in-house applications. MoES further stated that there are not many private entrepreneurs working in these niche areas. The contention of MoES is not acceptable since patenting and commercialisation of the designs, mechanical instruments and other inventions resulting from Institute's activities are included in the mandate of NIOT. Further, to commercialise the instruments, NIOT had entered into an MOU

with BEL, and as an alternative measure, also invited tenders from suitable entrepreneurs, all attempts which remained unsuccessful.

#### **7.3.4 Conclusion**

The project on “Ocean Thermal Energy Conversion” failed to achieve its objective of generation of power from ocean thermal energy due to deficient project management and poor planning, rendering the entire expenditure of Rs.60.82 crore unfruitful. NIOT also failed to commercialise most of the technologies and instruments developed by it.