

REVIEW REPORT

NATIONAL BUILDING RESEARCH ORGANIZATION



BY

NATIONAL SCIENCE AND TECHNOLOGY COMMISSION

Review Panel

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1. Introduction

1. This is the Review Report of the National Building Research Organization, popularly known as NBRO. The objective of the review is to assist NBRO to improve its performance. The report is prepared by a panel of experts appointed by the National Science and Technology Commission which is mandated by the Science and Technology Development Act No. 11 of 1994 to review the progress of science and technology institutions. The Review study was carried out in the second quarter of 2011.

1.1 Vision, mission and objectives

2. The vision of NBRO is “Creating a safer built environment”
3. The mission of NBRO is “to promote and sustain research & development and provide technical services for disaster risk reduction and safer built environment”
4. The objectives of NBRO have been revised to cater the mandate of the ministry of Disaster Management. All the activities are redesigned focusing the main objective of ‘Disaster resilience’.
5. NBRO heavily relies on self-earning and most of her financial resources are generated through consultancy & testing services offered to the state and the private sector. Thus NBRO differs from traditional government agencies such as Departments. Unlike some other government institutions (e.g. CEB, NWSDB), it does not have a captured market.
6. At present time NBRO is a technical service provider and research and development institution where experts from multiple disciplines are working towards creating a disaster free safe environment for the nation. NBRO’s expertise extends into a wide range of disciplines such as environmental science, study of landslides and related geo hazards, human settlement planning, engineering project management, geotechnical engineering, and building materials engineering. NBRO at present serves as the research arm of the Ministry of Disaster Management.

1.2 History

7. NBRO was established in 1984 under the Ministry of Local Government, Housing and Construction by merging the existing Building Research Institute (BRI) of the State Engineering Corporation and the Soil Testing Laboratory of the Buildings Department.
8. In May 1988, NBRO was brought under the Urban Development Authority by a Cabinet Decision.
9. In 1989 while functioning as a unit under UDA, NBRO was brought under the Ministry of Planning and Implementation.
10. 1986 NBRO received substantial assistance from UNDP to strengthen its implementing capacity.
11. In 1993, NBRO came under the Ministry of Housing and Construction.
12. In 2007 NBRO was brought under the Ministry of Disaster Management and Human Rights
13. In 2010 NBRO came under the Ministry of Disaster Management.
14. Thus, since its establishment, NBRO has been institutionally placed under various Ministries and thus the activities and the priorities of the NBRO have also broadly reflected the interests and the needs of these Ministries.

2. Procedure adopted for performance review

15. The review process adopted include a multitude of approaches that include discussions and formal meeting with NBRO staff, stakeholders, referencing documents available at NBRO, observations of the working of NBRO and finally in depth discussions among the review consultants.

2.1 Documents

16. The documents referred to during the review process include the following
 - 16.1 Self-Assessment Report of NBRO for the Performance Review of S&T Institution of the National Science and Technology Commission.
 - 16.2 Official presentations made to the Review Team by NBRO and its constituent Departments
 - 16.3 Legal documents relating to the establishment and institutional affiliations of NBRO
 - 16.4 List of clients of NBRO
 - 16.5 Corporate Plan (2009-2011) of NBRO
 - 16.6 Minutes of Monthly Divisional Meetings
 - 16.7 Minutes of Biweekly Heads of Division Meetings.
 - 16.8 Minutes of the Interim Management Committee
 - 16.9 Progress Reports of Divisions
 - 16.10 Project Proposals submitted by the Divisions
 - 16.11 Internal Memos and Circulars issued by NBRO
 - 16.12 Research Publications by Divisions and the Staff

2.2 Discussions

17. The Review Team held both formal and informal discussions with the following staff of NBRO. The main purpose of these meetings were to obtain insights into the workings of the NBRO and the problems and issues they are facing in carrying out the activities of NBRO.
 - 17.1 Director General
 - 17.2 Heads of Divisions
 - 17.3 Scientific Staff of Divisions

2.3 Meetings

18 The Review Team also had several formal meetings with the NBRO staff and one meeting with the Stakeholders of NBRO. The main objective of these meetings were to obtain official views of the NBRO on the current status of NBRO and the potential problems and issues. The meetings held were as follows

- 18.1 Introductory Meeting with all Administrative and Technical Staff on August 03rd 2011
- 18.2 Meetings with Administrative and Scientific Staff of Divisions on 23rd and 24th August 2011
- 18.3 NBRO Stakeholder's Meeting on August 24th, 2011
- 18.4 Formal Meeting with the Scientific Staff on 25th August 2011
- 18.5 Formal Meeting with the Technical Staff on 25th August 2011
- 18.6 Formal Meeting with the Clerical and other supporting Staff 25th August 2011

2.4 Observations

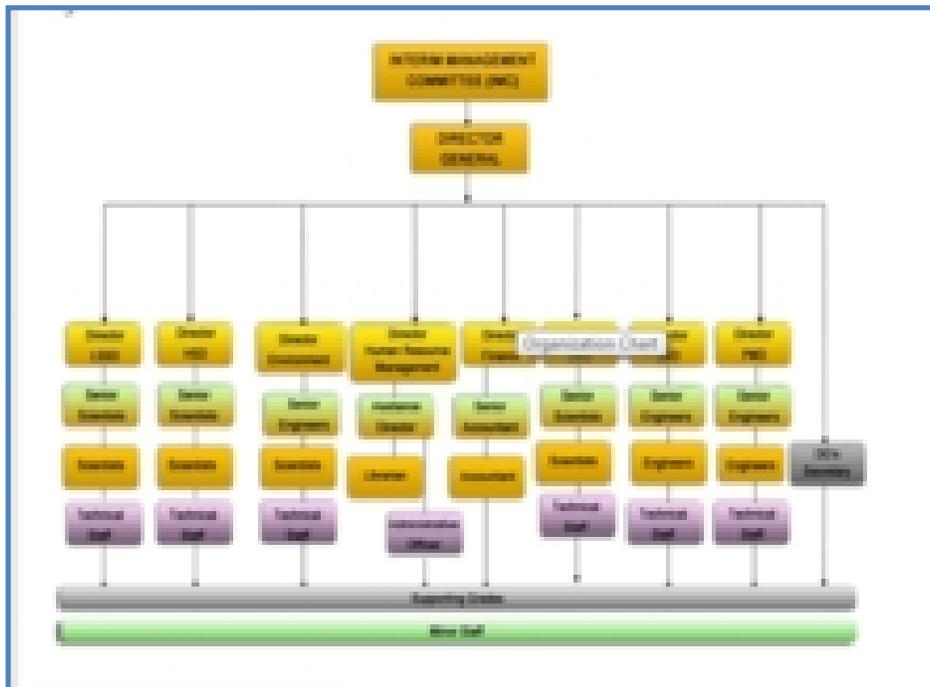
19. The Review Team made in-depth observations on the offices, laboratories and the working of all Divisions of NBRO on August 23rd, 24th and 25th August 2011. Two to three hours were spent in each Division first discussing with the administrative and scientific staff and second observing their working environment including laboratories. The Review Team also took the opportunity to ask questions from the staff during these observation sessions.

3. Management of NBRO

20. NBRO is a government institution serving under the Ministry of Disaster Management. It is funded primarily by the government but it also generates revenue by providing technical and laboratory services to both the government and private sector.

3.1 Management Structure

21. The following diagram depicts the management structure of the NBRO.



22. The Interim Management Committee (IMC) chaired by the Secretary to the Ministry of Disaster Management, which meets monthly provide overall direction to NBRO. It also functions as a monitoring body of NBRO.

23. IMC consist of five members with Director General/NBRO functioning as the Secretary.

24. IMC reviews and decides on the Papers/Memos submitted and also review the monthly financial statements approves the annual budgets.

25. The DG is the Chief Executive Officer of NBRO and he is responsible for overall administrative and financial management.

26. Each of the Division is headed by a Director and is responsible for the technical, administrative, and financial management of the Division and also to provide technical leadership to the Division.
27. Division Head is also expected to develop proposals to attract funds from outside sources.

3.2 Management Issues Identified by the Review Team

28. The Review Team identified a series of management issues some of which are structural to the institutional affiliation of NBRO and others relate to the functioning of NBRO.

3.2.1 Changes in Ministerial Affiliation

29. Since its inception, NBRO has been affiliated with different Ministries and thus the direction and priorities of NBRO had to be realigned with those of the respective Ministries.
30. The Corporate Plan (2009-2011) approved by the IMC on 08.02.2010 has identified the problem of changing Ministerial affiliation as a major problem for the long term stability of NBRO. The Plan, among others, indicates this issue in the following manner.
 - 30.1 "Political changes in the country affects the NBRO since, it does not have a given mandate. This change always creates outbound internal resources such as human resources and opportunities.
 - 30.2 Political changes and decisions lead to national level service gaps provided by NBRO and the mandate of the Ministry always restrict the services of NBRO depending on the changes made.
 - 30.3 As a result NBRO, after existence of 25 years, has a staff structure that is not conducive for scientific management techniques. Also remaining staff lacks motivation due to lack of political direction and policy on NBRO.
 - 30.4 Shifting among ministries and subsequent changes in management of NBRO lead to political interventions in decision making which affect the functions of the organization
 - 30.5 Even though NBRO functions as a semi-government organization, actual day to day activities are conducted similar to government departments. This nevertheless reduces the profit making ability. "
31. The Review Team generally agree with this assessment. They were also confirmed by the staff.

32. The most recent realignment of NBRO to complement with the vision and the mission of the Ministry of Disaster Management appears to be smooth, innovative and effective as there is a fair degree of complementarity between them.
33. The Landslide Studies and Services Division of NBRO, for example, is performing a very useful and effective role directly fulfilling the requirement of the Ministry of Disaster Management.
34. However, the changes in Ministry affiliation and the NBRO's attempt to adjust itself to them highlight several problems as given below.
 - 34.1 The difficulty in maintaining the original purpose of NBRO especially some of its Divisions in the light of the visions and missions of the new Ministries.
 - 34.2 The divisional structure of NBRO and especially the laboratories by their very nature continue to perform the originally intended services notwithstanding the changes in the institutional affiliation creating some degree of mismatch between NBRO and Ministerial objectives.
 - 34.3 Some divisions whose activities directly complement those of the Ministry to which NBRO is affiliated with are better placed and receive greater attention and funds while some others continue to function through sheer inertia without being able to organically fit into the new affiliation.
35. The Review Team proposes three recommendations to bring NBRO and all its divisions more effectively and innovatively in line with the Ministry of Natural Disasters and benefit from it
 - 35.1 To initiate an internal assessment of all Divisions and a brain storming session to find out how their current activities can be adjusted and modified to complement the Ministerial mandate.
 - 35.2 **To request the Ministry to make use of NBRO not only in managing natural disasters but also in disaster risk reduction in building and construction sector.**
 - 35.3 To request the Ministry of Disaster Management to utilize NBRO as a monitoring arm of the Ministries involved in building and construction industry.

3.2.2 Interdivisional coordination

36. NBRO currently has 6 divisions namely
 1. Building Material Division carrying out Research and Testing of Materials in construction sector.
 2. Geotechnical Engineering Division catering to geotechnical investigation needs
 3. Project Management Division catering to civil engineering and project management

4. Human Settlements planning Division catering to settlement planning
 5. Landslide Studies and Services Division catering to landslide hazard studies
 6. Environmental Division catering to environmental appraisal of development projects
37. These Divisions work independently and in relative isolation. This is largely because the tasks and activities of these Departments are different and often mutually exclusive.
38. The clients these Departments serve are also different. (see Annex 1 for a list of clients of NBRO)
39. In the recent decades NBRO has not been involved in a large scale project where the services of all six Departments are required.
40. Thus, each Division is left to its own initiative to look for projects to offer /sell its services to make it cost effective and or profitable.
41. The positive side of this is the creation of a competition among the Divisions to do more and earn more. However, the earning more does not necessarily depend on the competition and the capability of the Division alone.
42. As each Division is perceived and treated as a separate cost center with its own budget presented separately, each Division is compelled to locate income sources individually. Thus the structural fact of having divisions engaged in distinctively different activities and the management practice of treating divisions as separate cost centers and finally NBRO not being entrusted by other government agencies the responsibility of implementing large scale projects which would require the services of most if not all Divisions has prevented the Divisions working together as well as jointly seeking projects.
43. The relatively low government allocation to NBRO on the one hand and the necessary preoccupation of Divisional Staff looking for funds to maintain the Division and the larger institution has also had a negative impact on the research output of the staff.
44. In this context, it is inevitable that some Divisions will perform better than others and this has led to unfortunately some degree of discontent among Divisions.

45. The Review Team find that this to be unavoidable yet unhealthy for the future of NBRO as a S&T institution.

46. The Review Team thus suggests that NBRO to conduct a self-assessment to re-examine its Divisional structure and the tasks entrusted to them and especially the outcomes expected of them. Treating all Divisions equally and expecting the same performance and outcome from them and their staff is unrealistic.

47. Review Team is of the opinion that Divisions which provide definitive laboratory services should continue to cater to the needs of the government and private sector. They should not be considered as research divisions carrying out original research at least for the moment.

48. Review Team is also of the opinion that Divisions should share with each other when a Division is developing research and or funding proposals and explore the possibility of involving other Divisions.

48-49. Review Team also suggest that NBRO approaches, through the IMC and the Ministry of Disaster Management, other government agencies involved in large scale development projects in which NBRO can play a vital supporting service and try to persuade them to hand over some responsibilities.

49-50. NBRO should try to convince the government that as a state agency it should be given priority in selecting consultants to monitor large scale building and construction projects.

3.2.3 Human Resources

3.2.3.1 Current Status

51. NBRO as a Science and Technology institute largely depends on its human resources to provide its services to the nation. Thus a well-trained and high quality human resources is a sine-qua-non for the success and sustainability of NBRO.

52. The total number of staff at NBRO in 2010 stood at 192 of which Science and Technology staff numbered 49 (32%) and the technical staff numbered 21 (13.8%). The rest consists of administrative and supporting staff. (see Annex Chart for a summary of human resources at NBRO)

53. The ratio of scientific and technical staff to the total staff (1:3.6) is acceptable and should be maintained and possible attempts should be made to further increase the scientific and technical staff.
54. The academic qualifications of the permanent Science and Technology staff (only 31 out of 83 are in the permanent category) show that there is only two Ph.D , two M.Phil, eight MSc or equivalent and 20 have the Bachelors Degree or equivalent.
55. This is an area that NBRO has to work hard to improve if it is to maintain its current relative position among other institutions providing similar services. The future survival and expansion of the NBRO, especially if it expects to pay greater attention to research, will depends on having highly qualified staff.
56. Of the total carder positions of 223 only 195 or 87.4% is filled. However, the picture at the level of Scientific and Technology staff is alarming as only 52 positions have been filled out of total carder of 83 leaving 31 vacancies. In short 37.4% of the Science and Technology staff positions remain vacant. This has seriously undermined the potential of the NBRO in delivering its services. It is unfair to expect for NBRO to function at 100% with only 63.6% of the Science and Technology staff. Thus, the Review Team recommends that NBRO to take steps to fill the vacancies in the Science and Technology category.
57. Training provided for the staff of NBRO also appears to be inadequate. Most of the training is limited to "short term trainings" and "study tours/conferences". No postgraduate or diploma level training has been given to the staff. This too is a major inadequacy in a science and technology oriented institution such as NBRO. Lack of opportunities for training was highlighted strongly by the science and technology staff as a major issue.
58. Another problematic area is the lack of incentives for the staff. NBRO self-assessment made the following remarks on this topic " In certain instances, incentives are given to staff for timely completion of consultancies to improve consultancy based revenue generation. No financial incentives are given for R&D work. However, in principle, research is highly encouraged by the institution". The problem here is that not all staff has opportunities to engage in consultancy work and thus consultancy related incentives are structurally discriminatory. Second, research although encouraged have not figured in carrier advancements and promotions within NBRO.

3.2.3.2 Issues Relating to Human Resources

59. The Review Team met separately the various categories of employees of NBRO to assess their views and concerns relating to the human resources in the NBRO. The following issues were raised by the staff and the detailed discussions with the management also confirmed the prevalence of these views.
60. NBRO appears to suffer from a high turnover of its staff, especially in the senior scientific category. A large number of well qualified and experienced scientific staff has left NBRO for other state and private sector institutions providing similar services.
61. Dissatisfaction among both the Scientific and technical staff as well as the supporting staff was clearly visible. The Review Team identified a series of factors that has led to this high turnout and staff dissatisfaction.

61.2 Uncertainty of the job security at NBRO. As a semi-government and partially self-funded institution, NBRO cannot guarantee job security even to the permanent staff. This has led some of the staff to join other government institutions.

61.3 The lower remuneration package. It was very evident that the remuneration package of the scientific staff at NBRO is relatively lower than that in other similar institutes. This has led many promising scientific staff to join other government institutions and even the private sector.

61.4 Poor Incentive Package. In addition to the salary, only a very few other incentives are available to the staff in comparison with other institutions and private sector firms providing similar services.

61.5 Few opportunities for carrier advancement. The scientific and technical staff at NBRO is not affiliated to national level services. There are no opportunities for carrier advancement within NBRO.

61.6 Lack of promotions. Some of the senior staff has received only one promotion and have been stagnating at the same level for over 12 years. Some pointed out that there is no performance based evaluation of staff in considering for promotions. The proposed SOR (which did not take the concerns of the existing staff) too will not solve the problem.

61.7 Lack of facilities. Although the staff has increased, there has not been a corresponding increase in the working space. The Research Team too noticed the cramped working environment in some of the divisions. Even some of the laboratories did not have sufficient space. Lack of adequate transport facilities to the staff was also highlighted. Some of the scientific staff complained that they do not have computer facilities.

61.8 Information Communication Technology Plan. This plan has been developed and approved by the IMC. Some part of the plan i.e. the establishment of communication interface has already been implemented resulting in a trilingual website. This is a commendable activity. Other aspect of the plan should be implemented as an immediate priority.

61.9 Less priority to Research and publications. The scientific staff, although wanted to engage in research and publications, they are unable to do so as they have to spend their energies into the consultancy work to generate funds for NBRO. However, the Review Team identified that some of the consultancy and other work done by Landslides Division and Environmental Division and their outputs have an intrinsic research foundation. The Landslide zoning mapping for example is one of the most useful research work carried out by any Scientific and Technological institution in the nation.

61.10 Lack of a professional culture. According to some of the staff, the working culture within NBRO is not up to the level of that which should be in a Scientific and Technology institution. A series of circulars issued by a former Director General to the staff during a period from 2007 to 2009 clearly indicated the problems relating to the professional culture within NBRO. However, this problem has been rectified to a large extent today.

3.2.4 Review Teams Evaluation of Self-Assessment by NBRO on Management

62 The review Team had the access to the self assessment carried out by NBRO as part of the overall Performance Review of S&T Institutions by the NASTEC. A series of tables in the self-assessment has ranked its own performance in under three categories i.e. strong, moderate and weak. The Review Team reviewed the NBRO's own ranking and after the review visits, discussions and referring documents, and re-ranked them adding our own comments.

63 Review Tables. The modification of performance assessment and comments by the Review Team are highlighted.

i) **Assessment of Institutional Response to External and Internal Environment in Planning Organizational Strategy**

The external environment of an institution (e.g. consumer/industry needs, government policies, market conditions, partners, and competitors) will critically affect its performance. Science & Technology institutions need to regularly assess these in order to plan and respond effectively to challenges and opportunities, and to deliver results that are relevant and useful.

The external environment of Science & Technology / Research & Development institution is vibrant due to changes in stakeholder conditions and needs. It is important for an institution to periodically review and adjust its directions and goals, to meet these changes. These adjustments in turn may require significant actions, such as changes in focus and programs, organizational structure, and management strategies.

Management practice	Level of Practice (Performance Indicators)			Comments / Evidence
	Strong	Moderate	Weak	
Government policies and development goals are used/ considered to establish goals and plan organizational strategy for the institution	X X			The broad vision of the M/D defines the goals and plans of NBRO as evident from Corporate Plan
The organizational mandate (as specified by the relevant Act) is considered in strategic planning		X	X	There is no Act. Currently the M/DM agenda seems to define the NBRO mandate. Thus, there is a deviation from the original mandate.
The institution is responsive to changes in Government policies and strategies	X X			The changes of the Ministry seem affect the general direction strongly.
Factors such as strengths, weaknesses, threats and opportunities are considered in strategic planning		X		Too early to comment as SWOT is done only very recently.
Stakeholders needs are taken into consideration in strategic planning		X	X	There is no clear evidence of this. However, the needs of the M/DM is taken fully into consideration
The Board of Governors is involved in strategic planning			X X	Corporate plan is submitted to IMC for approval. One of the members of IMC has guided the preparation of the CP.

The extent to which staff members are involved in strategic planning			X X	HoDs have assisted in preparing the CP. No indication that other staff was involved. CP does not indicate the methodology adopted in developing it.
Government allocations and alternative funding opportunities (donor funding) are considered in strategic planning	XX			Yes
The extent to which policies and plans of the organization are reviewed and updated		X	X	Two CPs have been developed respectively for 2006-2009 and 2009-2011. There is no evidence to suggest whether the plans have been reviewed. However, fortnightly HoD meetings also seem to play a review role for the programmes and activities of NBRO. However, no documentary evidence was available to this effect.

ii) Planning S & T programs and setting priorities

A program is “an organized set of research projects, activities or experiments that are oriented towards the attainment of specific objectives”. Programs are higher in research hierarchy than projects. Program objectives should be consistent with organizational strategies and reflect user needs and development goals.

Management practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
National development goals are considered in planning programs & setting priorities	XX			The broad vision of the M/DM defines the goals and plans of NBRO as evident from Corporate Plan
Board of Governors participate in planning and priority setting of program			XX	Corporate plan is submitted to IMC for approval. One of the members of IMC has guided the preparation of the CP.
The extent to which the staff of the institution participate in programme planning and priority setting		X	X	No clear evidence of this except in the preparation of CP.
Stakeholder interests are considered in programme planning	X	X		Mainly the interests of the M/DM are considered.
The extent to which programmes are planned and approved through appropriate procedures	X	X		CP is approved by the IMC.
The extent to which the availability of funds (government allocations and other funds) generating funds are taken into consideration in planning programmes	XX			Yes
The obtaining of necessary equipment is considered in planning programmes	XX			Yes, as most of the NBRO's output require equipment.
Stakeholders are represented in the institution's planning and review committees.		X	X	IMC is represented by a small number of the stakeholders.
The extent to which socio economic and commercialization of aspects are considered in programme planning.		XX		As NBRO is largely self-financed, commercialization is heavily considered. Under the M/DM, socio-economic impacts of disasters have been integrated.
Effectiveness and efficiency of institutional procedures in approving new S& T programmes.	X		X	IMC is the approving mechanism of all new S&T Programmes.

iii) Planning S & T/ R & D Projects

A project is a set of activities designed to achieve specific objectives within a specified period of time. A project includes interrelated research activities or experiments, schedule of activities to be completed within a specific time period, budget, inputs and outputs, focused towards intended beneficiaries. Projects are the building blocks of programmes. For an institution to achieve its objectives, it is necessary for projects to be well planned in terms of their expected outputs, activities, and input requirements.

Management practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The staff is provided with guidance for project planning		X	X	No direct activity is visible.
Previous research results/data are used for planning projects		XX		Some project proposals e.g. landslide mitigation are based on previous research results
The extent to which the institution follows a formal process for preparation, review and approval of projects	X		X X	Project preparation are done by each division and approved by IMC.
The extent to which organizational plans (e.g. medium-term plan, corporate plan, strategy etc.) are used to guide project selection and planning	X	X		Corporate Plan seems to provide the overall guidance.
Multidisciplinary projects/ activities are encouraged by the institution		XX		By definition the disaster management projects are multidisciplinary but not all Divisions are involved
Foreign collaborations are encouraged and incorporated in planning.		X	X	UNDP had been a major foreign collaborator and a funding source.
Partnership with private sector is encouraged by the institution	X		X	Significant income comes from services provided to the private sector
The extent to which development research/activities are considered in planning projects		XX		Most projects at NBRO e.g. landslide mapping can be categorized as applied research.
The extent to which basic research are considered when planning projects			X X	As a self-finance institution, NBRO is not in a position to go deep into basic research.
The degree to which adverse effects on environment are considered in planning projects	XX			Fully, especially after NBRO came under M/DM

iv) **Project management and maintenance of quality**

Proper project management and quality assurance/improvement practices are needed to ensure effective research operations, the quality of output and achievement of desired objectives.

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The effectiveness of the procedures for resource allocation at different levels (organization, departments, program etc.)			X	
Ensuring that instruments, equipment and infrastructure facilities are sufficient for implementation of projects		X	X	NBRO needs new and better equipment
The effectiveness of administrative procedures and support for project implementation (procurement and distribution of equipment and materials, transport arrangements, etc.)			X X	Long delays in purchasing process
Formal monitoring and review processes are used to direct projects towards achievement of objectives		X		Weaknesses in certain sectors
The extent to which the researchers are supported by the required technical / field staff.		X		Limitations of skilled staff
Ensuring that established field / lab methods, and appropriate protocols are used	X			
Rresearch projects/ S& T activities are completed within the planned time frame.		X		Limitations of skilled staff
Ensuring that scientists / researchers have access to adequate scientific information (scientific journals, internet, international databases, advanced research institutes, universities etc.) that strengthens the quality of research.		X		All are provided with internet. However limited access to other facilities
The extent to which quality assurance practices are followed by the institutions		X		
Ensuring that researchers/ scientists have access to computers and necessary software		X		financial limitations to purchase software

v) Human Resource Management

Availability of an adequate number of qualified staff and effective management of human resources are key determinants of organizational performance. Establishing a cadre of qualified staff takes many years. To keep pace with new developments in science, technology, and management, it is also essential to upgrade staff regularly. Staff planning, selection, recruitment, evaluation, and training are key components of human resources management that need to be in place for effective performance of an institution.

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The institution maintains and updates staff information in a database (including bio data, disciplines, experience, publications, projects)	X		X	Weaknesses in certain areas No central database and the information is scattered.
The institution, plans and updates its staff recruitments based on programme and project needs	X		X	NBRO has been losing its high quality staff over the years
The effectiveness of the selection procedures and the schemes of recruitment		X	X	Most of the technical and non-technical staff was critical of poor implementation of SOR and the “unreasonableness” of the proposed SOR.
Training is based on institution and program objectives and on merit,		X	X	Limitations occur as NBRO has to depend on external sources for training Very little training opportunities are available for staff.
The effectiveness of the procedures in promoting a good working environment and maintaining high staff morale.			X X	Strong limitation as there is no formal procedure to retain skilled staff A large number of scientific and technical staff is demoralized due to lack of promotions, incentives, training and carrier advancement.
The effectiveness of staff performance appraisals			XX	No formal performance appraisal available.
The effectiveness of rewards and incentive schemes in motivating the staff		X	X	Only for consultancies. Currently no functioning rewards and incentive schemes
The effectiveness of managing staff turnover, absenteeism and work interruptions.			XX	NBRO has been losing high quality staff. NBRO has been seen as a spring board until a better paid job is secured. Absenteeism has been a problem but has improved.

vi) **Management of organizational assets**

Organizational assets include not only staff buildings, equipment, and finances, but also include assets such as knowledge, technologies developed, intellectual property, and even credibility and reputation. A continuous effort is needed to protect all of these assets, because they are the basis for the sustainability of the institution and allow it to continue delivering quality research and service outputs.

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The ability of the institution to carry out its mandate and the assigned statutory powers		XX		Act should be finalized The new mandate under the M/DM is carried out. However, the original "building research" mandate has received low priority.
Infrastructure (buildings, stations, fields, roads) is satisfactorily maintained.	X	X		Visited only the head office. Can be vastly improved and made aesthetically more pleasing.
Vehicles and equipment (lab, field, office) are properly managed and maintained.	X	X		Lack of sufficient space is a major problem.
The effectiveness of procedures to ensure that equipment are in working order	X	X		Some of the equipment were not in working order
The effectiveness of the institution's overall strategy in generation and proper utilization of funds		XX		NBRO has to depend on self-earning funds and some Divisions are primarily geared towards this.
The extent to which the institution identifies opportunities for income generation and cost recovery	X	X		The M/DM has become the primary source of funds directly and indirectly. The testing done by labs generates some funds. NBRO does not have opportunistic approach for income generation
The extent to which the intellectual property rights of the institute are protected	X			OK. NBRO's effort to make some of its most important findings available in the internet is a lesson that some other government institutions need to learn.

vii) **Coordinating and integrating the internal functions/ units/activities**

The planning and coordination of units (departments, divisions, committees, research stations, etc.) and interaction among them are often neglected and it affects the overall performance of the institution. The organization of these units and the overall structure need to be reviewed from time to time to ensure smooth and efficient operations. The planning and coordination of units, logistics, resources, and information flows are necessary to achieve integration and smooth functioning.

Management Practice	Level of Practice (Performance indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The extent to which institution is evaluated internally and restructured based on current needs		X	X	No evidence of this. Many officers indicated that the NASTEC review was the first opportunity they got to evaluate the institution.
The effectiveness of internal communication and coordination mechanisms		X	X	No effective day to day communication vertically or horizontally within the system. Some divisions were not aware of the activities of others.
Institution's overall direction and coordination are provided by a central planning committee / unit.			XX	No dedicated Central Planning Committee. The IMC may be the one that come close to it. The Monthly HoD meeting may also provide some direction and coordination.
The extent to which different units are assigned clearly defined functions	XX			Yes to the extent that divisions work in isolation.
Responsibilities of research / management staff are clearly identified			X X	NBRO has a very narrow definition of research. Significant amount of work done by NBRO is research but it is not perceived as such. In an institution like NBRO research and management have to be done by the same personnel.
Effectiveness of using appropriate reporting procedures and feedback in management at different levels			XX	No formal system of reporting and receiving feedback and this may be one of the reasons for the frustration of the staff.

viii) **Partnership in managing information dissemination**

An important requirement of all S& T / Research & Development institutions is management of dissemination of technology and information to users. The partnership / linking up with other actors in Science & Technology and information system (including, universities, industries, private sector, international research organizations, extension, farmers etc.) promotes information exchange, collaboration, and cost sharing, and ultimately improves the quality and relevance of research.

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The institution systematically plans and performs dissemination of information	xX			Further improvements are envisaged Good production of material and the Website is useful and effective.
The extent to which the institution plans and maintains linkages with key partners for sharing and dissemination of information	X	X		Needs further improvements in certain fields Formal information sharing is enabled and constrained by the institutional hierarchy of the government.
The effectiveness of institutional procedures for technology transfer			xX	There is no evidence of NBRO developing its own technology except in the case of landslide mitigation.
The effectiveness of the system to obtain feedback from different types of stakeholders		X	X	No formal system. The Stakeholders were not fully aware of the mandate and capabilities of NBRO

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

Monitoring (assessing ongoing S&T / research activities) and evaluation (evaluating the value, quality and results of research) are key management processes of public-S& T institutions. Monitoring and evaluation are also important for determining whether the institution is learning from its earlier achievements and failures. Monitoring, evaluation, and reporting procedures need to be properly designed (i.e. integrated into project planning and implementation) and periodically reviewed, in order to provide useful information for decision-making and accountability.

Management Practice	Level of Practice (Performance Indicators)			Comments/ Evidence
	Strong	Moderate	Weak	
The institution monitors and evaluates (M&E) its own activities periodically		XX		Needs further improvements in certain areas IMC and Monthly HoD meetings performs this function.
M&E is supported by an adequate management information system (MIS), which includes information on projects (e.g. costs, staff, progress, and Results).		X	X	Needs further improvements in certain areas A common MIS for NBRO does not exist.
The extent to which S & T results and other outputs are adequately reported internally (e.g. through reports, internal program reviews, seminars).			XX	Needs strong improvements in many fields Annual symposium, Website and annual progress reports perform this function to some extent.
External stakeholders contribute to the M & E process in the institution		X	X	Needs improvements M&E is by the IMC and M/DM. No formal mechanism to involve other external stakeholders.
The extent to which the results of M&E are used for project/ research planning and decision-making.			XX	Needs strong improvements in some fields. No formal mechanism to get M&E into research planning but to some extent to project planning.

3.2.5 Management of the HQ premises

64. The HQ premises is centrally located within the city of Colombo and thus within easy reach of its clients.
65. The original building of NBRO is an impressive but subsequent additions have been ad hoc making it aesthetically unpleasant and inefficient from utility point of view.
66. The premises need better reorganization for increased efficiency.
67. The Review Team thus suggests an immediate commission of an space audit and an energy audit to make the HQ more efficient and also aesthetically more pleasing and customer friendly.
68. The Review Team also recommend the need for a spatially efficient new building for NBRO at the same location. There is sufficient space within the existing premises for a new building.

3.2.6 Challenges of a semi-self-financed institution

- 69 The legal position of NBRO is not clearly defined. NBRO was not formed by an Act of Parliament.
- 70 It is an institution established by a Cabinet decision and an Interim Management Committee guides and direct the administrative, financial and management functions of NBRO.
- 71 Over the years it has been affiliated with various Ministries and thus the direction and priorities of NBRO has been defined by the respective Ministries.
- 72 NBRO receives GOSL funds as capital expenditure for procurement of equipment and as some research grants. But NBRO depends mostly on revenue generated by carrying out consultancy work and providing some technical and laboratory services to meet its recurrent expenditure.
- 73 Thus, NBRO is under pressure to seek consultancy work for both the state and private sector. A lot of time of senior staff is spent in bidding for consultancy work and writing proposals making it difficult for them to engage in research activities and publications.
- 74 All Divisions within NBRO are not equally placed in seeking consultancy work. As a result some divisions which were successful in winning consultancy work are subsidizing the other divisions.
- 75 Consultancy work is not assured on a regular basis and thus the income received by NBRO from consultancy work is highly volatile.
- 76 Uncertainty of regular income from consultancy work has affected NBRO in a number of ways (as indicated in NBRO Annual Reports 2007, 2008, 2009 and 2010).
 - 76.1 High staff turnover especially in the professional categories
 - 76.2 Inability to fill the carder vacancies.

- 76.3 Inability to increase the salaries of the existing staff
- 76.4 Inability to effect the promotions of the existing staff
- 76.5 Inability to provide effective incentive schemes to the staff
- 76.6 Inability to improve the HQ premises and buy new equipment due to insufficient funds
- 76.7 Inability to provide high quality professional and post-graduate training to its staff.

- 77 All these problems have affected the competitive edge of NBRO as a Science and Technology service provider to the nation. They have also affected successful operation of NBRO, let alone its sustainability and future expansion.
- 78 The problem is compounded as NBRO has a number of competitors both in the private and state sector providing similar services and bidding for the same consultancy work and/or providing similar laboratory services.
- 79 Although NBRO is a government institution, obtaining the services of NBRO by state sector institutions involved in building and construction industry is neither required nor mandatory.
- 80 The Review Team therefore suggests that NBRO should request through its IMC to request that state sector institutions involved in building and construction industry to obtain the services of the NBRO as a priority. This will ensure a steady flow of business and income for the NBRO. This is a call to re-establish the precedence that existed during the early years of NBRO.

3.2.7 Advertising and promotion.

- 81 The Review Team clearly identified that NBRO is not sufficiently advertising and promoting itself highlighting its capacities in providing technical and laboratory services.
- 82 The stakeholder meeting also highlighted this point by saying that some of them came to know of NBRO by accident or through the others.
- 83 The Website of NBRO is of high quality and sufficiently informative about NBRO and its activities but it needs to give priority to the services it offers highlighting its competitive edge. This is all the more necessary as NBRO has to attract more clients to raise funds. NBRO website should be more attractive and reorganize as a business institution.
- 84 NBRO also need to organize informative and promotional workshops and seminars to the state and private sector.
- 85 NBRO should request the parent Ministry to promote it among other state sector institutions involved in building and construction industry.

- 86 NBRO should make its presence known in all major exhibitions highlighting not only its current work but also the technical and laboratory services it can offer.

4. Services and Output of NBRO

4.1 Type of services and Outputs

- 87 NBRO currently provide the following services (see the NBRO website for details under each of these services)

- 87.1 Building Material Testing
- 87.2 Environmental Testing
- 87.3 Geotechnical Testing
- 87.4 Landslide Studies and services
- 87.5 Project Management

- 88 NBRO also engage in research activities in the following areas

- 88.1 Building Material Testing
- 88.2 Environmental Testing
- 88.3 Geotechnical Testing
- 88.4 Landslide Studies and slope stability
- 88.5 Structural Engineering

- 89 The types of outputs of a science and technology institute such as NBRO falls into the following categories.

- 89.1 Technologies developed
- 89.2 Technologies transferred to industry/entrepreneurs
- 89.3 Information dissemination/extension
- 89.4 Research publications
- 89.5 Patents
- 89.6 Services (testing, , consultations, advisory etc.)
- 89.7 Trainings

4.2 Assessment of Services and Outputs

- 90 Given the nature of work in different Divisions within NBRO not all division has the ability to produce all outputs listed in Paragraph 89.
- 91 However, Review Team found that NBRO has not yet developed any new technologies, although it anticipates to do so under the proposed NBRO Three Year Development Plan. But the Review Team thinks that this will not be possible without having highly qualified staff (NBRO possess qualified staff in some areas) **who will engage in fundamental research in building and construction industry and state of the art equipment.** Technology transfer is only possible once this is fulfilled.
- 92 However the application of new technologies has been implemented in landslide mitigation work.
- 93 NBRO does not yet have a patent to its credit. This is not possible until the conditions stated in paragraph 91 is fulfilled.
- 94 NBRO fairs reasonably well in the area of information dissemination and extension. This is found primarily in the area of landslides. This has been possible as NBRO has been entrusted by the Ministry of Disaster Management as the lead agency in the nation in landslide studies and mitigation. The new Circular issued by the Ministry of Disaster Management – NBRO 2011/1 has now made the approval of NBRO compulsory for building construction in landslide prone areas. With this NBRO has given the role of an approving agency elevating its position to a significant level in the nation. NBRO has produced a series of guideline documents and maps that are essential to comply with this decision. These products are freely available to the people through its website and from the NBRO HQ. This is a commendable achievement of NBRO and undoubtedly the most significant national service of NBRO.
- 95 The achievement of NBRO in the area of landslide studies and mitigation is indicative of its potential when the necessary mandate along with the financial support is provided by the

government. This need to be replicated in other areas of services currently offered by NBRO which are in a fairly underdeveloped level. It is unfortunate that some of the data collection that NBRO initiated e.g. air quality has been subsequently taken away from NBRO and given to other agencies. NBRO needs to protect the activities and services that it initiate or given to it and resist attempts to redirect them to other agencies.

- 96 Research publications defined as publication in academic/professional journals and presentations at professional and academic fora by the staff of the NBRO is at an acceptable level although there is more room for expansion. Some divisions e.g. Environmental Division, Landslide Studies Division has been performing better in research publications especially because their activities have a research orientation than other divisions such as Project Management. Further improvement in this area requires adequate time free of engaging in consultancy work for the staff. NBRO has organized Research Symposium consecutively from 2009. This need to continue in collaboration with other S&T institution in the field of building and construction and especially with the Universities.
- 97 One of the key outputs of NBRO is providing test certificates on building materials and the number of such certificates is over 4000 a year. This is an area where NBRO can once again rise to the level of national center but it requires more and better equipment and additional qualified technical staff.
- 98 NBRO does not offer formal training programs of its own either to its own staff or outsiders although considerable potential exists. For example, the landslide studies, mapping, and mitigation activities could provide lot of opportunities for training of its own staff as well as University students, staff of other related government and private agencies. This can be done through formal training programs and on the job training and through internships.

5. Productivity of NBRO

99. The NBRO self-assessment very briefly comments on its productivity based of outputs and S&T staff very briefly as follows “ Compared to the strength of S&T staff, efficiency and quality of outputs needs thorough proper personal skills development”.
100. Thus it is also suggested that NBRO engage in an exercise of assessing its productivity and implement a series of program of personal skill development.
101. The Review Team agrees with this assessment but we believe the productivity increase at NBRO also needs the following changes.
- 91.1 Ensuring job security
 - 92.1 Increase of salaries to the same levels as in other similar S&T institutions
 - 93.1 Promoting staff at right time based on performance
 - 94.1 Providing a better incentive package
102. As indicated earlier staff satisfaction of majority of the Scientific and Technical staff at NBRO remains at a low level mostly due to the above mentioned reasons. This undoubtedly affects not only the productivity but also potential innovations and mostly importantly the commitment and dedication to the institution.
103. There is no existing system to quantitatively measure the productivity of NBRO as a whole or its Divisions separately. Thus it is suggested that a simple mechanism and set of indicators be developed to assess the productivity of NBRO.

6. Overview and Recommendations

6.1 NBRO's performance

~~104.~~ The original purpose for which NBRO was established, to be a “building research organization of the nation” remains unfulfilled. This was not due to factors internal to NBRO but primarily due to the failure of the government to make use of NBRO for the purpose for which it was established.

~~104-105.~~ The changing affiliation of NBRO with different Ministries with different mandates has led NBRO to attune itself with these mandates and reorient its vision and mission. Thus the priority areas of NBRO has also changed over time.

~~105-106.~~ Only the laboratory services which were originally provided by NBRO continue unabated. But over the years a number of other government and private sector institutions have emerged providing similar services and thus NBRO is facing stiff competition from them affecting its revenue base.

~~106-107.~~ Declining revenue base of NBRO has led to a series of management problems among which the loosing of highly qualified staff and declining staff satisfaction of the remaining staff have been primary.

~~107-108.~~ Overall, NBROs performance as a S&T institution ranks as average. The Review Team identified a lot of potential for NBRO to emerge as one of the top overall S&T institutions and as the top S&T institution in the field of building research. However, this potential remains unrealized due to financial, and human resources inadequacies and the necessary institutional support from the government institutions working in the area of building and construction.

~~108-109.~~ NBRO has excelled as the top most S&T institution in the nation in the field of landslide studies and mitigation. The success of the landslide studies and landslide mapping carried out by NBRO has led the Ministry of Disaster Management to effect a policy change in the construction in landslide prone areas by making NBRO approval compulsory. This was

possible after NBRO was brought under the Ministry of Disaster Management and the necessary institutional support and involvement of NBRO in landslide studies and mitigation.

~~109~~.110. Mapping of landslide prone areas in the country itself must be taken as both fundamental and applied research output of the highest calibre. Only a few S&T institution has contributed this kind of nationally significant and socially relevant product. This alone is sufficient for NBRO to be proud of itself as having made a major contribution to the nation. This makes NBRO stands out as a unique S&T institution in the nation.

~~110~~.111. Other testing and laboratory and technical services relating to buildings and construction are noteworthy contributions made by NBRO to both the state and private sector.

~~111~~.112. NBRO which had been facing significant financial problems in the mid 2000 has been able to overcome these problems but it has not yet been able emerge as a highly profitable institution which pays dividends to its employees, majority of whom are still suffer from staff dissatisfaction.

6.1 Recommendations

113. The Review Team make following recommendation to make NBRO a more productive and efficient S&T institution in the field of building and construction research.

114. NBRO is not in a position to decide to which Ministry it gets affiliated. Although a Ministry dealing with building and construction would be the ideal place for NBRO given its original mandate, NBRO has to innovatively redefine its priorities and activities to suit whatever the Ministry it get affiliated with. NBRO has been very creative in redefining its vision and mission within the larger mandate of the Ministry of Disaster Management. However, NBRO need to inform through its IMC to the Ministry of Disaster Management of its original purpose of being a national building research organization and get the Ministry to assist NBRO to develop its human and physical resource base in this area as well.

115. Whatever the Ministerial affiliation NBRO should not lose sight of the fact that it has been and should continue to be the national focal point in building research. This is the primary S&T

niche of NBRO and it should have a defined and clear program of action to realize this and move out of activities that other S&T institution can do better.

116. NBRO should maintain its original mandate irrespective of the changes in Ministerial affiliations.
117. NBRO should continue the practice of holding monthly HOD meetings and Divisional meetings and decisions taken should be implemented.
118. NBRO should encourage its staff to engage in fundamental research in building and construction and provide sufficient financial and institutional encouragement to its scientific and technical staff to engage in such research.
119. NBRO should be looking towards sustainable, energy efficient and low cost buildings with a reduce carbon foot print as a future research priority as this is also becoming a global priority especially in the context of resolving climate change induced global environmental problems.
120. This should be an effort combining the resources and expertise of all the Divisions within the NBRO. Such an effort will also remedy one of the key problems within NBRO – the isolation of Divisions and lack of integration among them.
121. NBRO should explore the possibilities of working in collaboration with other S&T institutions without losing its own identity and authenticity.
122. NBRO should engage in an effective publicity campaign to inform other government agencies and private sector of the services it can offer and thus to expand its revenue base. NBRO through these and other similar activities should build its own corporate image and identity and make NBRO more visible in the nation especially in the building and construction research field.
123. NBRO as a S&T institution in the building research sector should also explore the possibilities of getting involved in various government policy making fora, committees etc. In the building and construction field. This will give a high visibility to NBRO and will make it more relevant in the respective fields.

124. NBRO should work hard to re-establish staff satisfaction and to prevent further losses of its scientific and technical staff by introducing promotions based on performance evaluation.
125. NBRO should seek funds from the government to pay salaries of the permanent staff.
126. NBRO should make a concerted effort to get the NBRI Act passed in the Parliament as a priority. If this is achieved a large number of problems inherent in NBRO, especially relating to lack of funds and uncertainty and job insecurity of its staff could be resolved (see Annex 4 for the draft NBRI Act).
127. It is important from now on and certainly once the Act is passed in the Parliament, NBRI actively pursue through the governments help and intervention to implement **all** activities listed in Section 6 of the act.
128. NBRO should carry out a space audit of the HQ and make it a more efficient, customer friendly and aesthetically pleasing. The NBRO should also think of a more spacious building at the same premises.
129. The library should be improved with e-facility and government funds should be sought to subscribe for relevant journals
130. NBRO should have wider publicity. Continue with the NBRO Symposium and NBRO Newsletter and give it a Review Process in Photos
131. NBRO should develop regional laboratories with facilities such as mobile monitoring units
132. NBRO should develop infrastructure for application of GIS technology in the disciplines of disaster risk reduction and environmental management etc. to support geographical data base management and real time monitoring and modeling
133. **The Review Team proposes three recommendations to bring NBRO and all its divisions more effectively and innovatively in line with the Ministry of Natural Disasters and benefit from it.**

~~133~~-134. _____ To initiate an internal assessment of all Divisions and a brain storming session to find out how their current activities can be adjusted and modified to complement the Ministerial mandate.

135. To request the Ministry to make use of NBRO not only in managing natural disasters but also in disaster risk reduction in building and construction sector.

136. To request the Ministry of Disaster Management to utilize NBRO as a monitoring arm of the Ministries involved in building and construction industry.