Capacity Needs Assessment of the Natural Resource Sector in Cambodia

Institutional Capacity Building of the Tree Seed Sector
Cambodia Tree Seed Project (CTSP)
Jointly implemented by Forestry Administration and Danida

Phnom Penh, October 2005

ACKNOWLEDGEMENT

Since 1993, millions of dollars have flowed into Cambodia to support capacity building in the natural resource sector. Notably Cambodia's two principal guardians of natural resources, Ministry of Environment (MOE) and Ministry of Agriculture, Forestry and Fisheries (MAFF), have received considerable international support of which a large portion have been earmarked for *building capacity* in the natural resource management sector. After more than a decade of support Cambodia's natural resources arguably face bigger challenges than ever. While there have been noteworthy progresses on some fronts it appears that MOE and MAFF still struggle with insufficient human, institutional and financial capacity to manage its natural resources appropriately. This has led to speculate if the capacity building exercises of the past have resulted in anticipated outputs and if not, why?

This capacity needs assessment of the natural resource sector was commissioned by the Cambodia Tree Seed Project in order to identify key short-comings that previous capacity building support has either neglected or allocated insufficient resources for as well as recommend possible future intervention that could result in measurable improvement.

First of all our sincere thanks go to Dr. Carl Traeholt for undertaking the main planning and executing parts of this study. The task of measuring capacity for students, employers, educations institutions and ordinary NRM staff and officers against actual needs was a challenging one. Nonetheless, Dr. Traeholt succeeded in analysing the available data to draw substantial and highly valuable conclusions for consideration by any stakeholder in training and education in Cambodia.

In the process of carrying out this assessment support came from many levels, in particular, Dr. Jenny Daltry from Fauna & Flora International who provided invaluable advice whilst developing the questionnaire and the report; and Miss Lim Sopheap for her immense undertaking in distributing and collecting questionnaires from personnel all over Cambodia. Thank you! A further thank you goes to staff of the Cambodia Tree Seed Project for their innovative ideas and ongoing assistance and Mr. Richard Paley from Fauna & Flora International for his comments and suggestions.

The opinions and conclusions drawn in this report are those of the consultants and not necessarily fully shared by Cambodia Tree Seed Project, Forestry Administration and Danida.

Phnom Penh, August 2005

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EXECUTIVE SUMMARY

Danida and Dfid are currently in the process of preparing a joint 5-year Natural Resource Management Programme, to begin in 2006. It will be implemented within selected geographical areas of the decentralised public administration, focusing primarily at the commune level. It is assumed that all new programmes with elements of NRM will require qualified staff with an understanding of natural resource management in its *entirety*. This includes, for example, technical skills, research and analysis, planning, participation, organisation, transparency, and accountability. However, the capacity of existing NRM departments, educational establishments and training institutions to meet such needs is, at best, very uncertain.

Given the uncertain capacity of NRM departments, the Cambodia Tree Seed Project/Danida commissioned a short "needs assessment" of the combined NRM and relevant educational sector in order to ensure NRM Programme intervention at the most appropriate levels. The overall objectives of this study were:

1. To assess the qualification and number of staff needed for future natural resource management in Cambodia.
2. To analyse the current capability of existing educational and training establishments to meet the needs identified in '1'.
3. To identify gaps requiring fulfilment.

The study targeted eight different institutions in the natural resource and higher educational sectors. A set of questionnaires containing more than 70 questions in four different groups (institutional, job, analysis, and education related) was distributed to 120 mid- and high-level managerial staff, lecturers, and students from the Forestry Administration (provincial and central), Ministry of Environment (provincial and central), provincial government departments, NGOs, Royal University of Phnom Penh, Royal University of Agriculture, Prek Leap National School of Agriculture, and Kampong Cham National School of Agriculture.

The study revealed that many recent and ongoing capacity building projects have not achieved their objectives to the fullest, and have had insufficient progressive impact on certain subjects critical to modern natural resource management. The report argues that the primary reason for this is that contemporary development projects rarely focus on specific capacity building objectives, but rather provide capacity building as a "by-product" of mainstream development and planning projects.

Building capacity on top of knowledge foundations that are either weak or non-existent is impractical and extremely cost ineffective. For the same amount of support it is possible to develop proper Diploma, BSc and MSc curricula in NRM with structured accreditation for staff and/or students. Local graduate students, who are sometimes equipped with better ecological and academic knowledge, are the primary losers resulting from the current donor support short-cut policy of supporting in-service training rather than the real professional foundations.

This report critically discusses the value of providing *ad hoc* 3-5 day "training courses" as components of a larger project, identifying the possible weaknesses of this approach. By arguing that, when the main assumption (e.g., fundamental ecological and analytical knowledge), is essentially absent, 3-5 days training course will rarely have the desired impact.

In all participating institutions the study found a serious capacity needs in analytical capacity, institutional knowledge, and specific fundamental topics within mainstream natural resource management. Without these, the sustainability of future development and capacity building projects in Cambodia will be compromised.

A problem regarding "analytical capacity" is to define it precisely. In development contexts, it often drowns in donors' inclinations towards more "sexy" approaches, putting emphasis on conceptual and

holistic understanding. While NRM poses genuine complex challenges and necessitates holistic overview, it is crucially dependent on personnel that are able to "form" individual attitudes, opinions and possible solutions to multifaceted problem scenarios. This is not possible without prior *analysis* of the specific components that the problem consists of.

The Oxford University Press's Advanced Learners Dictionary defines "analytical" as: "*Using a logical method of thinking about something in order to understand it, especially by looking at all the parts separately"*. This also includes being able to intuitively transform a set of data from a table into figures and/or illustrations on paper, as well as reading, interpreting and understanding the information contained in figures. The current survey reveals, with indisputable clarity, a need for building analytical capacity.

Building analytical capacity in contemporary Cambodia will pose an enormous challenge. Many Cambodians remain comfortable with the traditional prescriptive norms of behaviour, and therefore, bringing analytical capacity into the mainstream Cambodian society and subsequently the NRM sector requires intervention and should be seriously considered in the short term future.

The study recommends that particularly bi- and multilateral donors acknowledge that capacity building cannot be achieved through a few 3-5 days training outputs alone. Capacity building in NRM requires multifaceted and multi-level intervention at both the natural resources and educational sectors.

The report also discusses how traditional Cambodian leadership structures must give way to a more contemporary approach. Without dynamic multi-level communication, integrity, commitment and team synergy, corruption and nepotism will continue to thrive and sustainable NRM continue to struggle. The study reveals that many staffs/students have little faith in merits in relation to job applications and put little emphasis on job satisfaction.

ABBREVIATIONS

ACIAR	Australian Centre for International Agricultural Research
ASEAN	Association of Southeast Asian Nations
AUSAid	Australian Agency for International Development
BDC	Belgium Development Cooperation
BioD	Biodiversity
BPAMP	Biodiversity and Protected Areas Management Project
CBFiM	Community Based Fire Management
CBFS	Capacity Building Project of the Forestry Sector
CCPF	Central Cardamoms Protected Forest
CDC	Council for Development of Cambodia
CI	Conservation International
CITES	Convention of International Trade in Endangered Species
CTSP	Cambodia Tree Seed Project
DANIDA	Danish Agency for International Development Assistance
DED	German Development Service
DES	Department of Environmental Science (RUPP)
DNCP	Department of Nature Conservation and Protection
DWNP	Department of Wildlife and National Parks, Malaysia
EIA	Environmental impact assessment
EIP	Education Investment Plan
ESP	Education Strategic Plan
EU	European Union
FA	Forestry Administration
FAO	Food and Agriculture Organisation
FFI	Fauna & Flora International
GEF	Global Environment Facility
GTZ	Deutsche Gesellshaft fur Technishe Zusammanarbeit
IDA	International Development Association
IUCN	International Conservation Union
JICA	Japanese International Cooperation Agency
KCNSA	Kampong Cham National School of Agriculture
MAFF	Ministry of Agriculture, Forestry and Fisheries
MEF	Ministry of Economy and Finance
MOE	Ministry of Environment
MoEYS	Ministry of Education, Youth and Sports
NGO	Non-governmental organisation
NR	Natural Resources
NRM	Natural Resource Management
NTFP	Non-timber forest product
RGC	Royal Government of Cambodia
RUPP	Royal University of Phnom Penh
RUA	Royal University of Agriculture
PLUP	Participatory Land-use Planning
PLNSA	Preak Leap National School of Agriculture
SIDA	Swedish International Development Agency
UNDP	United Nations Development Programme
USAid	United States Agency for International Development
USEPAM	University Support to Environmental Planning and Management
WB	World Bank
WCS	Wildlife Conservation Society
WWF	Worldwide Fund for Nature

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"To seek prosperity for a year, plant grain; for a decade, plant trees; for a century, educate your people"

- Kuan Tzu

1. Introduction

In 1993, the United Nations promoted and oversaw national elections in Cambodia. It was widely regarded as the first "free" democratic election since the French colonial era ended in 1953 and it signalled the beginning of an immense international support to the rehabilitation and reconstruction of Cambodia's degraded economy and social structure. Whilst a stagnant economy combined with little experience in the principles of free-market economy constitutes formidable development challenges, the crisis in Cambodian education was evident only a few years after independence. For most of the post-colonial period there has not been a stable well-established Cambodian educational structure, and consequently quality of instruction has rapidly degenerated. While the crisis was apparent long before the dark years of civil unrest the tumultuous circumstances during the 1970s added to the woes of the educational sector. Today the consequences are as evident as ever, since there is a serious undersupply of sufficiently skilled and experienced personnel for both the Government and private sector in Cambodia.

Therefore, capacity building constituted a key component in almost every project that was intended to support the reconstruction of Cambodia. In 1995 the Ministry of Education, Youth and Sports (MoEYS) supported by the international community revealed its first attempt to reform the educational sector by publishing the Education Investment Plan (MoEYS, 1995). The plan, however, judged by a sector performance review, failed to live up to its promises. Subsequently, MoEYS (2000, 2004) drafted the Education Strategic Plan 2001/05 followed by the recent Education Strategic Plan 2005/08 intending to reignite the reform and development of the educational sector. The ESPs, however, do not focus on specific "in house" training facilities such as JICA Forestry Training Centre and Kampong Cham National School of Agriculture that are both under the Forestry Administration (FA) of Ministry of Agriculture, Forestry and Fisheries (MAFF).

Although the basic need for an overall reform of the education sector was evident, international donor institutions and a number of NGOs focused capacity building efforts primarily within governmental ministries and departments in the hope that such training would lead to relatively rapid progress and increased self sustainability of the respective authorities.

The chronic need for at least a minimum of staff capable of managing, leading and developing the country justified intervention at this level. However, the underlying reasons for continuing the very strong bias towards intervening at Government staff level rather than at higher educational level are uncertain. While the wisdom of supporting primarily government institutions can be debated, the decision assumed that the concerned government departments and ministries already possessed the necessary educational foundation upon which capacity can be built. It has become evident that this assumption is far from fulfilled.

The natural resource sector constitutes one of the most supported sectors in Cambodia. The two principal authorities responsible for natural resource management in Cambodia, the Ministry of Agriculture, Forestry and Fisheries (MAFF) and Ministry of Environment (MOE), have received capacity building support, since 1993, that amounts to more than 200 million US$.

In spite of this exceptionally large financial and technical support, donors are becoming increasingly discouraged by the limited progress seen within this sector. While an impressive protected areas network has been legally established, practical management of these areas continues to be marred by illegal activities (primarily logging), lack of transparency and capacity to implement laws and regulations imperative to proper NRM. In addition the much awaited forestry sector reform pledged by FA and supported primarily by WB failed to deliver its expected outputs spurring extensive re-evaluation and restructuring of many donors' development programme to Cambodia.

Danida is currently in the process of preparing a 5 year Natural Resource Management Programme to begin in 2006. It will be implemented within selected geographical areas of the decentralised public administration, focusing primarily at the commune level. It is assumed that all new programmes with elements of NRM will require qualified staff with understanding of natural resource management in its *entirety*. This includes, for example, technical skills, research and analysis, planning, participation, organisation, transparency, accountability, but the capacity of existing NRM departments and educational establishments and training institutions to meet such needs is at best very uncertain.

Given this uncertainty, the Cambodia Tree Seed Project/Danida commissioned a short "needs assessment" of the combined NRM and relevant educational sector in order to ensure that NRM Programme intervention at the most appropriate levels. The overall objectives of this study were:

- To assess the qualification and number of staff needed for future natural resource management in Cambodia.
- To analyse which capacity and quality the existing educational and training establishments deliver in terms of meeting such needs.
- To identify gaps requiring fulfilment.

1.1 Review of ongoing projects

A number of very important projects are being implemented, either by bi- or multilateral organisations or by international NGOs. Some, with significant capacity building components, are reviewed below.

1.1.1 Biodiversity and Protected Areas Management Project (BPAMP)

The overall development objective of BPAMP is to assist the RGC to achieve sustainable management of the National Protected Areas System. The project, however, focuses mainly on Virachey National Park, as a test model for future management projects. The project is anchored in the Department of Nature Conservation and Protection (DNCP) in MOE and receives approximately US$1.91 from International Development Association, a branch of the World Bank, as "innovative" credit, and US$2.75 million from UNDP/GEF.

1.1.2 Commune and Community Based Natural Resource and Environment Management Project

The project, implemented since January 2004, is funded by Danida and supplements the SEILA Programme. It aims at building capacity at commune and community levels to enable local sustainable management of natural resources and the environment with a view to poverty alleviation. The number of communes targeted is 166 and the four year project period funding amounts to approximately US$6.2 million.

1.1.3 Community Forestry Programme

Concern Worldwide commenced a Community Forestry Programme in January 2003. The immediate objective is to create an environment that builds the capacity of development actors to facilitate and enable community forestry initiatives. The project is implemented in close cooperation with community organisations and local NGOs, and operates with a budget of approximately US$2.0 million for the 3-year project period.

1.1.4 Capacity Building Programme for the Forestry Sector in Cambodia

This project began in 2001 aimed at building capacity within Cambodia's FA in such areas as forest restoration, NRM and community forestry. It is anchored in the FA and funded by the Japanese International Cooperation Agency (JICA). The project identified a range of topics where FA needed further training, and outlines an action plan addressing these issues. According to an international FA assessment the necessary funds for addressing all current needs amounts to more than US$ 2 million. The project continues for another 3 years.

1.1.5 Participatory Natural Resource Management in the Tonle Sap Region

The project was supported by the Belgium Development Corporation and Food and Agriculture Organisation of the United Nations (FAO) and started in 1995. The overall objective of the project was "Sustainable management of natural resources within the Tonle Sap basin through local community participation for the benefit of rural people and communities". Emphasis was on building local community capacity to facilitate productive and sustainable community based natural resource management. In the seasonally flooded zone around the great lake, the project was involved in pioneering work with fishing communities to protect and manage thousands of hectares of inundated forest habitat for production of both fish and forest products. In the upland areas, the concept of community forest management is spreading rapidly as communities seek to protect and conserve rapidly disappearing forest resources. Phase 3 tried to consolidate accomplishments and experiences accumulated since 1995. Standardized guidelines were prepared for use in other parts of the country and this phase focused on documentation and the transfer of knowledge and experience to other provinces.

1.1.6 National Capacity Development Project (MOE)

The National Capacity Development Project is a 4-year project initiated in December 2001. DANIDA provides a budget of approximately US$ 3.5 million for the project implemented in close cooperation with the Ministry of Environment (MOE) although it also involves five other ministries: Ministry of Agriculture, Forestry and Fisheries; Ministry of Industry, Mines and Energy; Ministry of Water Resources and Meteorology; and Ministry of Land Management, Urban Planning and Construction. The immediate objective of the project is to develop capacity within key natural resources, environment and aid organisations in order to integrate environmental and related social concerns into policy, strategy, operational systems and procedures, and awareness creation at the political level and amongst the wider public. One of the key outputs of the project is the State of Environment Report summarising Cambodia's contemporary natural resources, values and future challenges.

1.1.7 The Cardamom Mountains Wildlife Sanctuary Project

The Cardamom Mountains Wildlife Sanctuary Project is funded by UNDP/GEF, EU and UNF targeting the overall protection and management of Phnom Aural and Phnom Samkos Wildlife Sanctuaries. Fauna & Flora International (FFI) provides MOE with support and technical advice. Although capacity building constitutes only one of the main objectives in reality it is a vital component in all other objectives too. The project receives approximately 2.5 million US$ and commenced in October 2003 with an expected duration of 3.5 years.

1.1.8 Central Cardamom Protected Forest

Central Cardamom Protected Forest (CCPF) consists of approximately 402,000 hectares situated between Phnom Aural and Phnom Samkos Wildlife Sanctuaries. Global Conservation Fund provided funding to launch the Central Cardamom Protected Forest Project in 2002. Through an initial grant, Conservation International (CI) and other organizations worked with Cambodia's Forestry Administration (FA) (in 2002 it was known as Department of Forestry and Wildlife) to collect the environmental, biological and cultural data needed to justify placing the region under protected status. Subsequently, UNDP/GEF supported the development of a management plan for the CCPF, a project with substantial capacity

building resources. The first phase of the project has been completed, however, the FA and CI partnership continues with CI primarily providing FA with capacity building support. The total amount of funds provided for the project exceeds 2 million US$.

1.1.9 Species programmes

Most of the international conservation NGOs collaborate with FA and DNCP in a large number of species and community based programmes

1.1.10 Cambodia Tree Seed Project

The Cambodia Tree Seed Project (CTSP) became operational in late 2001 with FA as the principal host-institution, funded by Danida with an initial budget of approximately US$ 2,000,000. Its overall objective is to improve the institutional capacity of seed collection, conservation and use, and promote the use of quality seed countrywide. The project puts special emphasis on indigenous tree species and conservation of forest genetic resources as well as looking into improving the quality and growth rate of indigenous species. CTSP also promotes and encourages participatory approaches to forest gene conservation, an important component in poverty reduction and sustainable livelihoods. The project is ongoing and terminates in the first half of 2006.

1.2 Review of support to the educational sector

Although MoEYS's EIP and ESP identified universities and other higher learning institutions for substantial reform and financial support these institutions continue to suffer from lack of sufficient funds, standardized educational service and lack of research plans. Many lecturers and support staff are extremely committed, however, they are constrained by limited experience and resources. Until recently, international donors rarely focused on environmental studies, that have been largely absent from the university curriculum. Although MAFF and MOE are inherently linked to, in particular, Royal University of Agriculture (RUA), and Preak Leap Agricultural School as sources of new and *qualified* staff; international support for these institutions remains insignificant in comparison to the financial and technical support offered to, for example, FA and MOE.

The Royal University of Phnom Penh (RUPP) received technical and financial support from Danida through the USEPAM Project (University Support to Environmental Planning and Management) to establish an under graduate programme in Environmental Science which includes natural resources management. The USEPAM project is implemented in Cambodia, Lao PDR and Vietnam with technical support from Asian Institute of Technology, Thailand and Roskilde University, Denmark. In Cambodia, the project aims at enhancing the capacity of RUPP, especially the Department of Environmental Science (DES), to provide multidisciplinary education and applied research in support of environmental planning and management. The project started in 2003 and during the 3-year project period the funding available amounted to US$ 137,000.

Danida also supports **Curriculum and Course Material Development for the B.Sc. in Environmental Science** Program at RUPP. This project was initiated in 2002 and has received funding amounting to US$ 200,000 for a 3-year period. The project objective is to allow RUPP's Department of Environmental Science to develop a comprehensive curriculum, including course materials and other supportive teaching materials for its B.Sc. programme in Environmental Science.

In 2003-2005 JICA allocated approximately US$ 175,000 supporting the same two initiatives in RUPP.

In June, 2005, Fauna & Flora International, in partnership with RUPP, commenced the project **Development of a MSc Programme in Biodiversity Conservation** aiming at developing Cambodia's first MSc curriculum in the NR sector. The project is anchored at Department of Biology at RUPP and is planned to continue for 3 years. Some of the immediate objectives are to develop an MSc course with international standard lecturing (primarily undertaken by foreign staff) and examination processes. This

will be followed by thesis work that puts emphasis on applied research within contemporary Cambodian NR topics. Additionally, the project aims at assisting to establish basic infrastructure such as a library, botanical, and zoological reference collection, paramount to producing future skilled NR personnel. The principal donor is Darwin Foundation whose support amounts to US$ 280,000.

Kampong Cham National School of Agriculture is supported by the Australian Centre for International Agricultural Research, which has provided 5 million US dollars of funding, Lutheran World Foundation, which has provided approximately 10 million US dollars for rebuilding the school and providing equipment, OISCA International, and JICA.

2. SECTOR OVERVIEW

In reality most Cambodian Government institutions are linked to NRM in one way or another. In this section focus is on the two principal institutions responsible for managing Cambodia's NR, MAFF and MOE, as well as principal educational institutions responsible for training future NR managers, researchers and innovative personnel.

2.1 Ministry of Environment (MOE)

The programs of the Ministry of Environment are concerned with the environment, natural resources management, and poverty reduction. One of the key responsibilities for MOE is to manage Cambodia's national parks and wildlife sanctuaries spanning over a total of approx. 2,770,000 Ha. Furthermore, MOE is responsible for carrying out and advising the RGC on environmental impact assessments.

Official MOE statistics in 2004 indicated that there were 1,325 employees of which 3.9% are degree holders (Table 1). On average each staff is responsible for approximately 20.4 km^2 of protected area. In reality, however, this figure is much larger because not all of MOE is responsible for PA-management. Currently, this task falls under the Department of Nature Conservation and Protection (DNCP).

2.2 Ministry of Agriculture, Forestry and Fisheries (MAFF)

The Ministry of Agriculture, Forestry and Fisheries has four strategic goals. These are:

1 - To encourage development of the agricultural sector;
2 - To continue the rehabilitation of physical infrastructure;
3 - To promote rural development and plan civil works; and
4 - To build capacity and develop human resources.

It is somewhat perplexing that sustainable forest management is not listed as one of the four strategic goals of MAFF. In this report we will only be dealing with one of the key administrative units in MAFF, namely Forestry Administration (FA).

2.2.1 Forestry Administration (FA)

One of the key functions of FA is day-to-day management of forested areas not gazetted as national parks or wildlife sanctuaries. According to Prakas Nº: 509 PK/MAFF/B the FA is responsible for overall sustainable forest management which includes activities such as forest protection, issuing logging permits, silviculture, forest rehabilitation, boundary demarcation, fire management, wildlife management and protection and public awareness. The area under FA jurisdiction spans over approximately 7,390,000 Ha. Apart from the "mainstream" forestry management FA Prakas Nº: 509 PK/MAFF/B stipulates two important duties pertaining to education,

1) To manage and develop the government officials of FA for the whole country, from the central, inspectorate, cantonment, division, to the triage level.

2) To develop and implement programs for research, protection and conservation of forest resources and wildlife

The FA has 1,824 officers, 296 (16.22%) are assigned to FA headquarters in Phnom Penh, and the remainder to local offices. The number of degree holders is small at 2.7% of the total number of employees (Table 1). On average each staff is responsible for approximately 405.2 km^2 of forested area in Cambodia.

Table 1. Staff and Educational Backgrounds in Six Institutions.

	No. Staff		Qualification of Staff				No. Students	
Institution	**Women**	**Men**	**Ph.D**	**MSc.**	**BSc**	**Other**	**Women**	**Men**
Royal University of Phnom Penh (Faculty of Science)	23	90	2	28	83	0	578	2567
Royal University of Agriculture	66	181	7	30	72	0	255	2385
Kampong Cham National School of Agriculture	12	77	4	15	40	30	137	692
Preak Leap National School of Agriculture	36	163	5	35	42	81	762	3389
JICA forestry training centre	0	11	1	3	3	4	109	916
Forestry Administration	135	1689	4	47	595	1178		
Ministry of Environment	138	1178	11	37	183	1094		

2.3 Royal University of Phnom Penh (RUPP)

Royal University of Phnom Penh (RUPP) is generally considered the primary government funded research and education institution in Cambodia. It is the oldest and largest of its kind in the country and holds more than 5,000 students at any time. It employs more than 200 lecturers across three faculties, of which only 7 hold a doctorate degree. In comparison, Copenhagen University's Biological Institute produced 17 Ph.D candidates in 2002 alone (Wang, 2003).

The Royal University of Phnom Penh has three primary goals. These are:

- To provide faculties with clear goals, objectives, and outlines for each course in a manner that will improve teaching performance;
- To provide students with comprehensive information about their course of study;
- To compile sources of information for external use (i.e., for supporters, donors, parents, and government officials) and international assistants.

RUPP has three faculties - Faculty of Social Science and Humanities, Institute of Foreign Languages and Faculty of Science. The latter employs 113 lecturers of which 22 (19.64%) are female (RUPP, 2004). Of these 26.5% are degree holders. There are 984 students at the Faculty of Sciences, 263 (26.73%) of which are female (RUPP, 2004).

According to the educational law a lecturer can only teach at university undergraduate level if s/he holds a minimum of an MSc degree. Therefore, the average number of students per lecturer is 32.8. In order to teach at graduate level a lecturer must hold a PhD or higher degree.

In spite of its genuine intention RUPP suffers from insufficient funding and currently there are no permanent research officers at the Faculty of Science. Staff is generally employed to conduct lectures, however, limited experience combined with financial and technical support makes it impossible for any staff to take up research tasks similar to international colleagues in developed countries.

2.4 Royal University of Agriculture

The objectives of the Royal University of Agriculture are to 1) offer quality education and training programs to students and staff in rural and agricultural fields with high academic standards, morality, and creativity that are consistent with national development requirements; 2) conduct rural and agricultural research themes in close cooperation with local and international research institutes and industries and companies; and 3) develop an information centre for disseminating agricultural sciences information and technology to the farming community.

The Royal University of Agriculture has 8 faculties and 1 Graduate School. It has 247 staff, 66 (26.72%) of whom are women. There are 109 senior lecturers permanently employed at RUA (Table 1) with another 76 lecturers attached from other institutions. While a few external lecturers are international technical advisors most of them come from the FA.

RUA is supported by USAid and JICA who finance one American and two Japanese professors, and GTZ through the placing of a volunteer.

2.5 Kampong Cham National School of Agriculture (KCNSA)/MAFF

The Kampong Cham National School of Agriculture is the country's primary training institution for Agricultural Technology, for which it offers an undergraduate Bachelor of Science degree. A short training course for farmers has been established in Kampong Cham province, 125 km from Phnom Penh. KCNSA is managed by MAFF and the Ministry of Economy and Finance (MEF). The cross-sector management structure between MAFF and MEF is to encourage KCNSA to increase its own technical capacity and increase the output of students with strong agricultural knowledge considered a key to reducing poverty amongst Cambodia's rural population.

Kampong Cham National School of Agriculture has 4 faculties, and employs 105 staff, including 45 full-time lecturers, 40 part-time lecturers, and 20 contract staff. The educational qualifications of KCBSA staffs are provided in Table 1.

2.6 Preak Leap National School of Agriculture (PLNSA)/MAFF

PLNSA conducts courses and training for undergraduate degrees in almost all disciplines related to agriculture. What subjects are taught depends on the market demand and Government policy, however, as with KCNSA emphasis on supporting poverty alleviation through providing local communities with increased agricultural knowledge.

Preak Leap National School of Agriculture has 10 Departments, and 82 full-time, part-time, and visiting lecturers of which 5 hold PhDs (Table 1).

Over the past twenty years, PLNSA has strengthened agricultural capacity by training 2,000 associate students and 1,000 agricultural extension workers in animal production, agricultural technology, agricultural economics management, land management, hydrology, horticulture, agribusiness, agricultural extension, and rural development.

3. METHODS

Theoretically speaking, NRM includes everything that deal with, for example, forestry, agriculture, national parks service, mineral extraction, oil and gas extraction, fisheries and land use planning. However, this needs assessment for NRM education will focus only on the NR components related to:

1. forestry
2. wildlife
3. national parks
4. protected areas
5. NRM and BioD education

According to Competence Standards for Protected Area Jobs in SE Asia (Appleton et al. 2003) there are at least 24 key protected areas jobs requiring approximately 250 different types of skills. For example, a casual labourer, an accountant, a ranger or a senior officer are positions that require entirely different types of skills, and even level of skills. Within the scope of this rapid assessment it is impossible to analyse all types and levels of jobs and associated skills needed in NRM and therefore focus has been narrowed down to include only personnel in the following positions:

1. Staffs with managerial and/or decision making tasks
2. Lecturers/trainers at universities and/or in house training facilities
3. Students at universities and other relevant training facilities

To cover all possible skills required in NRM it is necessary to develop at least 250 questions and present them to all levels of employment. After having narrowed the target personnel to three different groups, questions were limited to those pertinent to forestry, wildlife, national parks, protected areas and NRM education (Annex 1).

Additional questions were added in order to assess the analytical capacity of the respective target groups (Annex 2) as well as perspectives pertaining to educational standards and personal interests of individuals in the target group. The questionnaire was explained and completed through a structured interview.

Table 2. List of Institutions and Number of Respondents in the Survey

Institution	Number
Forestry Administration (HQ)	11
Forestry Administration (province)	8
Ministry of Environment (HQ)	9
Ministry of Environment (province)	4
NGOs	14
Government (Provincial)	13
Royal University of Phnom Penh (staff)	6
Royal University of Phnom Penh (student)	15
Royal University of Agriculture (staff)	3
Royal University of Agriculture (student)	16
Kampong Cham National School of Agriculture (staff)	2
Kampong Cham National School of Agriculture (student)	8
Preak Leap National School of Agriculture (staff)	2
Preak Leap National School of Agriculture (student)	8
Total	**120**

While there are many private colleges and universities, as well as many government departments, ministries and institutions that provide NRM education and training, it was necessary to limit the number of target institutions too. Therefore, eight target groups were short-listed to participate in the assessment. These consisted of staff and students from six institutions responsible for NRM and/or educating future staff in the NRM sector, NGOs (considered as one group), and finally RGC provincial staff (considered as one group). The latter consisted of governors, district governors, Seila-advisors, commune chiefs and deputies.

A total of 120 sheets were collected and analysed (Table 2). Scoring of the various questions is described below (Table 3). Question numbers are referred to as follows:

- Qi 7-21 = institution related capacity
- Qj 1-37 = job related capacity
- Qa 1-7 = analysis related capacity
- Qe 1-7 = education related capacity

Table 3. Scoring Methodology

Institution Related Capacity	
Qi 7	If the interviewee has answered the question s/he receives the score 1. If not, s/he receives a 0. Therefore, if the total average score approximates nil, it signifies only a few people know the mission/function of their institution.
Qi 8-9	1 = worst, 5 = best
Qi10	The responses are illustrated in Figure 1.
Qi 11-17	1 = worst, 5 = best
Qi 18-21	Specific analysis of these answers have been omitted since all respondents entered a job with minimum educational background (BSc) and provided the answer "yes" to the last three questions (Qi 19-21).
Job Related Capacity	
Qj 1-34	0 = worst, 3 = best
Qj 36-37	Both these questions have four possible answers. They have been scored from 1-4 with 1 being "not at all" or "never" and 4 being "perfect" or "more than once a year" (Table 4). In Qj 36, a score of 2 is equal to average or 50% satisfaction and 4 is 100% satisfaction. In Qj, 37 50-75% means that employees receive additional education once a year and 75-100% more than once a year.
Analysis Related Capacity	
Qa 1-2	A score of 1 was assigned to those answering the questions correctly i.e. circle "yes" supported with a drawing of a normal distribution and listing the five primary log-frame components. Answers that circle "no" are assigned "0". Answers that circle "yes" but do not provide requested illustration (see Annex 2) scored "0" as well.
Qa 3	Since this requires a short sentence that explains the concept of sustainable use there is an increased chance of language related misunderstanding. The questions have been evaluated carefully for a conceptual answer while discarding language "errors". For example, an answer like "sustainable use means resources can be used forever" will score "1" even if it is a very simplified answer to a complex topic. In this case "forever" suggests the resource is either not depleted over time, or is rehabilitated for continuous exploitation. However, an answer like "sustainable use means resources can be used for many years" will score a "0" since "many years" can be applied to most resources, even those that are depleted in time.
Qa 4	The answers were grouped into four different categories, 1) poor governance (corruption, poor management, illegal activities) 2) poverty (poverty, food deficiency) 3) encroachment/shifting cultivation 4) other While all are obviously related to each other, it provides a clearer picture of precisely where the main constraints are found.
Qa 5	Answering Exercise 1 correctly will score 1 point, answering both exercises correctly, will score 2 points. No answers, and two incorrect, answers will score 0 points.
Qa 6	Since some of the questionnaires were sent out without Exercise 3 (Annex 2), only the proportion of interviewees that received the correct exercise and hence had the opportunity

	of answering Qa 6 have been included in the analysis. The illustration contains two answers namely a) tail and body length are correlated to each other i.e. the bigger body length, the bigger tail length, b) tail length is generally longer than the body length. Therefore, respondents can score 0 points, 1 point and 2 points for answering nil, 1 and two questions correctly.
Qa 7	Correct answers score 1, wrong answers or no answer score 0. Many respondents have answered the following: Pramoy: 22.7-37.30°C, Phnom Penh: 27.2-32.80°C, Banlung: 21.4-38.60°C. While this gives a slight picture of the diurnal temperature fluctuation, the answer is *incorrect*. The standard deviation is described as $\sqrt{\frac{\sum(x-\bar{x})^2}{(n-1)}}$ and is *not* similar to stating the temperature change varies between the average +/- the value of SD.
Educational related capacity	
Qe 1-5	0 = worst, 5 = best
Qe 6-7	The answers to Qe 6-7 have been compiled into bar diagrams (Figures 4, 5a-b).

Since questions had different scoring levels, for example some are best of 1-5 whereas others are best of 0-3, all scores were converted into percentages of the respective scoring maximum. By adjusting all scores under similar units it is possible to rank responses to all questions and compare them directly with each other. The ranking of *all* questions/answers can be viewed in Annex 3.

Ranking was conducted within each subgroup, a) FA/MOE/GOV/NGO; b) educational staff; and c) students. Subsequently, the twenty lowest scoring questions/answers were compiled into Tables 4a-4c for analysis.

4. RESULTS

In all three groups the most noticeable and lowest scoring topics were related to analytical capacity, and are consolidated by the fact that responses on basic statistics and data analysis were absent from groups B and C suggesting that these two groups are unaware of their own limited analytical skills. The gap in "analysis" understanding is detrimental to all remaining topics in NRM since it renders doubtful the validity of tasks such as biological monitoring, EIAs, priority setting, data presentation and institutional evaluation (see Section 5.1).

Topics related to technical report writing, effective oral presentations, environmental impact assessments and reading technical reports or books in English, do not appear in Tables 4a-4c. However, not surprisingly, questions related to specific technical topics such as CITES, map-making and practical wildlife management in captivity, are represented.

The questions listed within Tables 4a-4c were explained to respondents during completion through structured interviews.

Tables 4a-c. The 20 Lowest Ranked Questions/Answers Listed in Ascending Order

Table 4a – FA, MOE, NGO, Provincial Staff			
Quest No.	**Question**	**Score (%)**	**Rank**
Qa 1	Can you illustrate a typical normal distribution?	6.79	1
Qa 2	Can you state the five primary components in a Log-frame?	12.14	2
Qa 7	Table 1 illustrate average temperature in three areas including standard deviation (SD). What can you say about daily temperature pattern in each area?	16.25	3
Qj 27	Practical management of wildlife in captivity	23.87	4

Qi 7	What is the main mission or function of your institution?	39.74	5
Qj 23	Map-making (could include sketch-mapping, digital mapping, etc)	46.18	6
Qj 20	Designing biological monitoring programmes	46.28	7
Qj 24	Invasive species control	46.40	8
Qa 5	Review exercises 1 and 2 and answer the questions attached	47.53	9
Qj 26	Developing or evaluating management plans for endangered species	48.13	10
Qe 5	What is most important in getting a new job - gradual from 1=connections only to 5=merits only	49.45	11
Qj 4	CITES	50.11	12
Qj 18	Leading or organising surveys of plant diversity	52.00	13
Qj 17	Leading or organising surveys of animal diversity	52.06	14
Qj 19	Measuring the density or abundance of a species in a given area	52.12	15
Qj 34	Carrying out an economic analysis of the use of timber or other natural resources (i.e. calculate income, expenditure, costs and values)	53.53	16
Qj 6	Basic statistics, such as Mean, Median and statistical tests?	54.94	17
Qj 30	Identifying priority areas for protection	55.23	18
Qj 21	Specifying sustainable quotas for collecting natural resources (e.g., timber, NTFPs)	55.27	19
Qj 7	Data analysis and interpretation?	57.87	20

Table 4b – Educational Staff

Quest No.	Question	Score (%)	Rank
Qa 6	In exercise 3 what are the two main information given in the illustration?	0.00	1
Qa 7	Table 1 illustrate average temperature in three areas including standard deviation (SD). What can you say about daily temperature pattern in each area?	0.00	2
Qa 1	Can you illustrate a typical normal distribution?	20.83	3
Qj 24	Invasive species control	42.50	4
Qj 23	Map-making (could include sketch-mapping, digital mapping, etc)	43.61	5
Qi 7	What is the main mission or function of your institution?	45.83	6
Qa 2	Can you state the five primary components in a Log-frame?	45.83	7
Qj 34	Carrying out an economic analysis of the use of timber or other natural resources (i.e. calculate income, expenditure, costs and values)	46.67	8
Qj 4	CITES	48.61	9
Qj 27	Practical management of wildlife in captivity	48.61	10
Qj 3	Land Law (2001)	51.39	11
Qj 25	Resolving conflicts between people and wildlife	53.06	12
Qj 31	Leading or directing law enforcement activities in the field	55.00	13
Qj 15	Participatory Land Use Planning (PLUP, or similar approaches)	56.39	14
Qj 26	Developing or evaluating management plans for endangered species	56.39	15
Qa 3	How would you define 'sustainable use'?	58.33	16
Qj 17	Leading or organising surveys of animal diversity	60.83	17
Qj 21	Specifying sustainable quotas for collecting natural resources (e.g., timber, NTFPs)	61.94	18
Qj 16	Negotiating conservation agreements with local communities	62.50	19
Qj 9	Identifying forest fire risks and planning fire control	63.61	20

Table 4c – Students

Quest No.	Question	Score (%)	Rank
Qa 1	Can you illustrate a typical normal distribution?	5.13	1
Qa 6	In exercise 3 what are the two main information given in the illustration?	14.06	2
Qa 7	Table 1 illustrate average temperature in three areas including standard deviation (SD). What can you say about daily temperature pattern in each area?	26.56	3
Qi 7	What is the main mission or function of your institution?	44.06	4
Qj 23	Map-making (could include sketch-mapping, digital mapping, etc)	44.70	5
Qj 3	Land Law (2001)	45.69	6
Qa 2	Can you state the five primary components in a Log-frame?	46.03	7

Qj 37	Do you receive additional NRM-related training as part of your job?	47.35	8
Qj 31	Leading or directing law enforcement activities in the field	47.49	9
Qj 14	Conducting socio-economic surveys	49.20	10
QJ 27	Practical management of wildlife in captivity	49.48	11
Qj 9	Identifying forest fire risks and planning fire control	49.57	12
Qj 4	CITES	49.81	13
Qj 34	Carrying out an economic analysis of the use of timber or other natural resources (i.e. calculate income, expenditure, costs and values)	50.28	14
Qj 15	Participatory Land Use Planning (PLUP, or similar approaches)	51.37	15
Qa 5	Review exercises 1 and 2 and answer the questions attached	51.84	16
Qj 26	Developing or evaluating management plans for endangered species	51.85	17
Qj 24	Invasive species control	52.18	18
Qj 30	Identifying priority areas for protection	52.65	19
Qj 21	Specifying sustainable quotas for collecting natural resources (e.g., timber, NTFPs)	53.13	20

4.1 Institution related capacity

There is broad consensus among all interviewees that management (65) and technical (82) capacity is needed in NRM (Figure 1). This pattern is consistent throughout seven out of eight institutions targeted in this study. FA, however, returns a higher need for management (19) than technical capacity (16).

RUA produced almost all the current interviewed staff in the NR and educational sector (Figure 2). While the group "others" includes private colleges, most of the answers were unspecified, for example, many simply answered "Cambodia". It is reasonable to assume that a large portion of these were also educated at RUA.

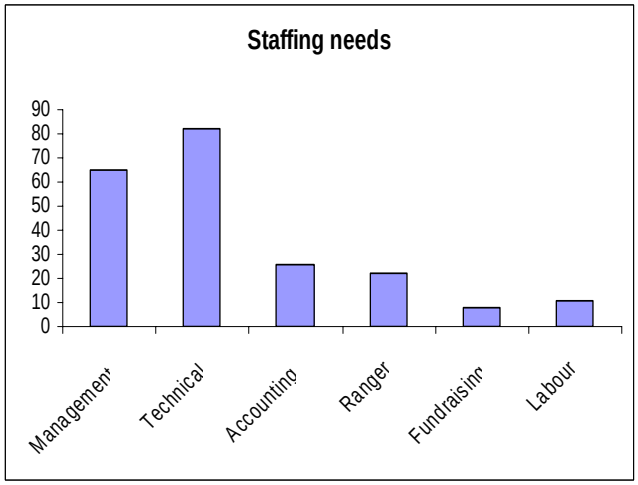

Figure 1. Summary of suggested staffing needs by 114 interviewed personnel in the Cambodian NR sector.

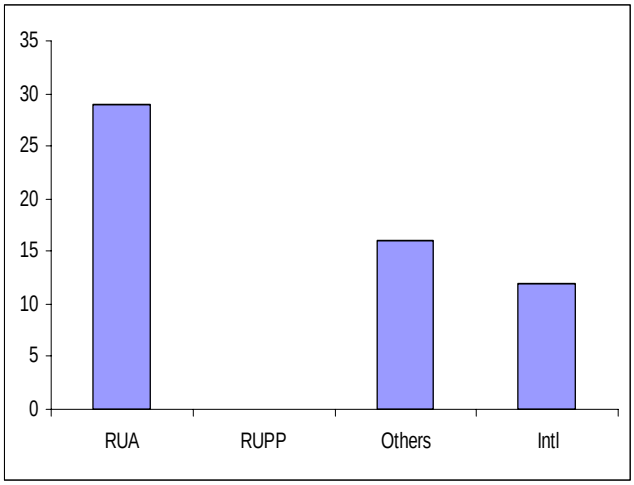

Figure 2. The educational institution where staff in the NR and educational sector received their degree

Most questions pertaining to institutional topics do not warrant serious further analysis. Only one made the twenty top ranked topics that need capacity building support (Tables 4a-4c), suggesting that most respondents are relatively satisfied with the achievements of their respective organisations, colleagues and career opportunities.

The one question that *is* ranked in the top-20 reflects a rather serious predicament because it suggests that 60% of government employees are unaware of their organisation's mission and function (Table 4a, and Annex 3). It is difficult, therefore, to evaluate the validity of responses in relation to organisational and staff performance. This same question ranks 6th and 4th respectively for staff and students in the

educational sector, showing a "better" performance than the government group, since a higher percentage are aware of their institution's function (Tables 4b and 4c).

There is broad consensus that "merit" should be the primary consideration when employing new staff. This received the most positive response (87.78%), ranked 56th (Annex 3). This positive trend, however, is off set by factors in obtaining new jobs, in which merit was very low, and ranked 18th overall (Annex 3). Staff from FA show the least faith in merits (25.45%) which suggests a risk that merit criteria will be substituted with nepotism and unfortunately this trend is supported by the opinions of most of the students that seek employment (Table 5) (see Section 4.4).

Institution	%
FA	25.45
NGO	47.14
RUA students *)	47.50
KCNSA *)	47.50
GOV	48.00
KCNSA staff	60.00
PLNSA students *)	60.00
MOE	64.00
RUPP students	70.91
RUA staff	73.33
RUPP staff	88.00
PLNSA staff	90.00

Table 5. FA staff suggests that merit counts for only 25% when applying for a job, whereas connections count for the remainder. Students marked with an *) normally seek jobs in FA

4.2 Job related capacity

Table 6 indicates a high level of job satisfaction and additional training once a year. Student responses have been omitted since they are not yet job relevant, and are discussed further under Section 4.4.

Table 6. Level of Job Satisfaction and Frequency of Extra Training (per year) amongst Staff in the NR and Educational Sectors

Question	FA/MOE/GOV	RUPP/RUA/ PLNSA/KCNSA
Qj 36. How well does your current job match with your "dream" job?	70.63%	76.88%
Qj 37. Do you receive additional NRM-related training as part of your job?	64.35%	65.83%

Although fire management does not appear on Table 4a, it is included in this section as one of the key limitations in Cambodia's NR sector. Whereas Group A (FA/MOE/GOV/NGO) claims to be familiar with forest fire management at level 3 (i.e. I know this well enough to teach others), the responses from Group B (education staff) and Group C (students) all fall within level 1 (i.e. I don't know much about it), suggesting that Group A's assumed fire management knowledge was not gained from local educational institutions. Furthermore, no bi- or multilateral projects address forest and wildfires in Cambodia. Therefore, the statement of fire management knowledge is interpreted as overestimating personal skills in a topic that is far more complex than it initially appears.

Wildfires ravage the Cambodian countryside every year. Fire is used by literally all local farmers to release certain minerals from harvested rice fields, although cannot always be contained. It is also deliberately ignited to induce higher resin extraction within dry forest areas of Mondulkiri and the Cardamom Mountains. Whatever the reason behind fires, there is little understanding of its management amongst local communities.

Capacity building in fire management needs to include an understanding of a) the causes of fire; b) the impact of fire; and c) the behaviour of fire.

4.3 Analysis related capacity

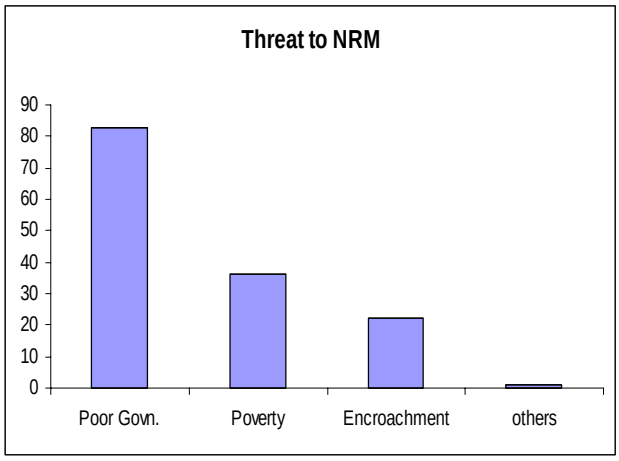

Figure 3. Main threats to Cambodia's NR as suggested by 120 survey respondents. Most participants stated more than one type of threat.

Annex 3 illustrates that most participants (66%) are familiar with the sustainable use concept.

The greatest perceived threats to the nation's natural resources are presented in Figure 3. Whilst these are obviously related to each other, Figure 3 provides a clearer picture of precisely where the main constraints are found, showing the main threat to be poor governance.

4. 4 Educational related capacity

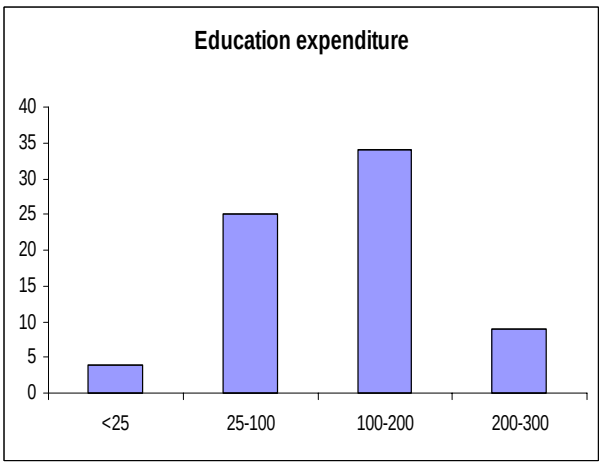

Figure 4. Extra curricular educational expenditure by participants included in this survey. The x-axis indicates US$.

Figure 4 shows that most interviewees spend more than 100 US$ per year on further education and that 96% of the respondents spend additional funds on furthering their education. This is surprising considering more than 60% receive additional education/training at least once a year from their respective organisations.

The overall responses from six of the participating institutions showed "satisfaction" to be the most important aspect of a job (Figure 5b). However, two institutions returned significantly different responses. Students in both RUA and PLNSA consider salary and career much more important than job satisfaction (Figure 5a). In fact, none of the students from PLNSA considered job satisfaction important. When associated with the Table 5, it suggests that the eradication of possible corruptive and nepotistic practices remain an enormous challenge to, in particular, FA in the near future unless significant steps are taken to change the attitude and beliefs of both students and current staff.

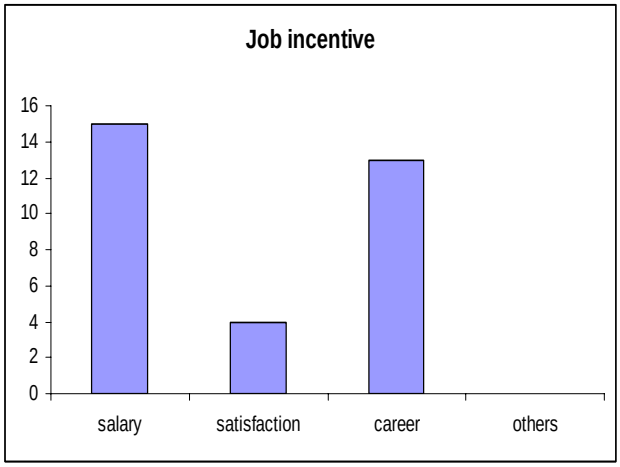

Figure 5a. The driving incentive for students at RUA and PLNSA.

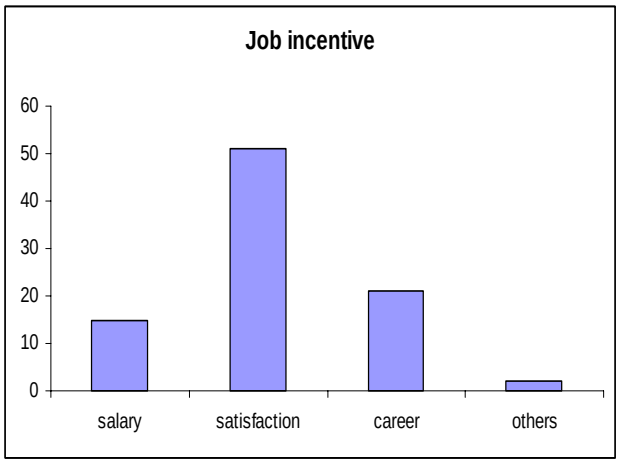

Figure 5b. The driving incentives for RUPP, FA, MOE, KCNSA, NGO and Gov.

4.5 Staff analysis of the FA/MOE sector

Currently, FA is charged with the management of a whopping 405 km^2 per staff whereas MOE manages approximately 20 km^2 per staff. In comparison, the Department of Wildlife and National Parks (DWNP) in Malaysia manages approximately 6 km^2 of similar habitats per staff with approximately 8% of the staff degree holders (DWNP, 1996) and the Malaysian Forestry Department manages less than 5 km^2 per staff.

It is clear that the expectations charged at FA and MOE are unrealistic with the current staff number and composition. The low number of degree holders (3% for FA) is particularly evident, especially when their effective analytical capacity is highly questionable (Table 4a). While the current structure of allocating ministerial counterparts to work with foreign donors may initially have been necessary, primarily due to limited other alternatives, a continuation of this procedure is ill-advised in the long-term perspective since it rarely results in building the necessary capacity and understanding of essential analytical concepts. In addition, due to the limited number of qualified staff, FA and DNCP are often forced to reassign and/or rotate staff between various projects. While this procedure provides personnel with broad conservation experience it hinders the continuity of conservation programmes. Since very few officers hold advanced degrees or possess extensive experience in NRM and conservation ecology it is imperative that staff is ensured long-term assignments to projects so they can, when external funds are exhausted, take ownership and continue the programme with financial support from their respective Government departments.

According to this survey, staff assignments are not often based on meritocracy. In order to ensure institutional strengthening it is important that potential staff is equipped with the necessary basic ecological knowledge *before* assignment to new projects. Proficiency in data analysis, interpretation and ecology must be considered a minimum when applying for any medium to high level job in any governmental sector dealing with NRM. Familiarity with, and understanding of, fundamental ecological processes are essential to identifying NRM and conservation problems and subsequently designing appropriate interventions.

Traditionally, capacity building has been undertaken primarily through development projects whose immediate objectives are often management planning, policy and institutional development. Too often capacity building constitutes a mere "side effect" of a project rather than being the focus of primary emphasis. While this approach is not necessarily ineffective, it is based on the critical assumption that host-nation staff possesses the fundamental NRM skills upon which capacity can be built. This is, however, far from always the case.

The current survey has revealed that there are many critical NRM topics that staff, primarily degree holders, is unfamiliar with. If this reflects a realistic situation, the critical assumption described above is not upheld, and therefore, **the necessary capacity building *cannot* be achieved through occasional 3-5 day training courses or as "on the job training" in projects with other immediate objectives.** Paramount to increasing Cambodia's self-reliance is that large donors ***acknowledge*** that capacity building requires more concerted and sustained efforts.

Building capacity on top of knowledge foundations that are weak or non-existent is impractical and extremely cost ineffective. The same amount of support that has been aimed at the NRM sector to date, could develop proper Diploma, BSc and MSc curricula with structured accreditation for staff and/or students.

Local graduate students, who are sometimes equipped with better ecological and academic knowledge, are the primary losers in the current donor short-cut policy of supporting post education training rather than real professional foundations. They are not only prevented from furthering their studies, but more importantly, **they cannot provide a natural continuity of local staff replacement in the government sectors**. Ultimately, this policy undermines the incentive for local students to venture into the natural resources sector since they have little chance of a) getting a job and b) making a career for themselves.

4.5.1 Gender

According to this study, a vast majority of mid to high level managerial jobs are held by men (Figure 6). Of a total of 61 people interviewed in FA, MOE, NGOs and GOVN departments only three (4.91%) were women and they all worked in NGOs. Theoretically, this skewed distribution may be due to a) no women wanted to participate in the assessment or b) women are extremely under represented in the NRM sector.

While there are significantly less female than male students enrolled at all the participating educational institutions the percentage of female students is a lot higher (20-25%) than the percentage of female employees in the NR sector (Table 1). The reasons for the substantial "drop out" of women at job level is unclear, however, a study into this scenario should be undertaken to identify the underlying reasons.

A balanced gender distribution is advantageous and whereas affirmative actions should not replace meritocracy when employing new staff, women should definitely be encouraged to pursue a career and offered similar opportunities as their male peers in the NR sector.

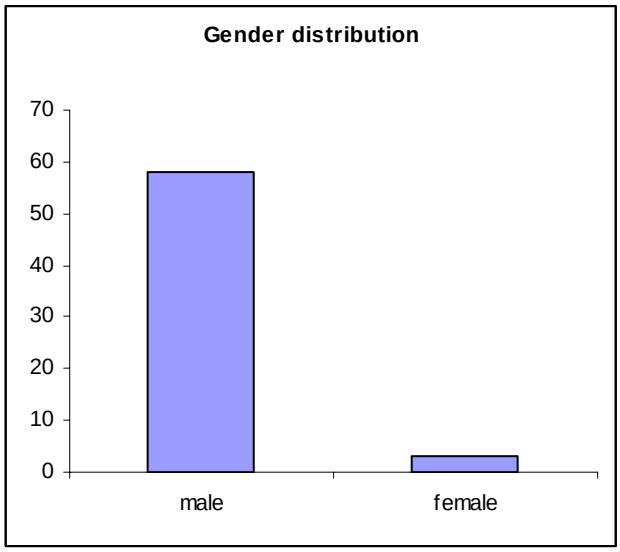

Figure 6. Gender Distribution in Mid-High Level Managerial Jobs

5. CONCLUSIONS

5.1 Analytical Capacity

The results from this assessment clearly identify one particular topic where capacity is sorely missing throughout all sectors involved, namely analytical capacity. Considering that most participants from Groups A (FA-MOE-GOV-NGO) and B (educational institutions) hold MSc or diplomas it is disturbing that none of the staff in the educational sector were aware of the functions of its institution. The ability to read and interpret tables and illustrations are equally weak amongst Group A (FA-MOE-GOV-NGO) respondents. Although not presented with Exercise 3 within the questionnaire, there is little to suggest that they would have performed better than their Group B (educational institutions) peers. It is somewhat surprising that some students still managed to answer these questions correctly.

Box 1:

"Learning without thought is labour lost".

- Confucius

The problem about "analytical capacity" is to define it precisely. While most western educated people are fully aware of its meaning, in development contexts, it often drowns in donors' inclination towards more "sexy" approaches highlighting interdisciplinary subjects and putting emphasis on conceptual and holistic understanding. While NRM poses genuine complex challenges and necessitates holistic overview it is crucially dependent on personnel that are able to "form" individual attitudes, opinions and possible solutions to multifaceted problem scenarios. This is not possible without prior *analysis* of the specific components that comprise the problem. Without a basic "scientific" perception of the surrounding social and natural environment it becomes almost impossible to implement *and* monitor impact of any kind of proper NRM and intervention.

Oxford's Advanced Learners Dictionary defines "analytical" as:

"Using a logical method of thinking about something in order to understand it, especially by looking at all the parts separately"

This also includes being able to intuitively transform a set of data from a table into figures and/or illustrations on paper, as well as reading, interpreting and understanding what information a figure contains. The current survey reveals with undisputable clarity a need for building capacity within this framework.

Building analytical capacity in contemporary Cambodia will pose an enormous challenge. In a country where normative traditional poems, *chbabs,* continue to form the underlying wisdom of most Cambodians many remain comfortable with the *chbabs'* tradition of *pre*scribing norms of behaviour rather than *de*scribing them. The poems are neither to be questioned nor to serve as a basis for critical discussion. Ayres (2000) suggests they were crucial in maintaining harmony, balance, regularity and conformity in the past.

Therefore, bringing analytical capacity into the mainstream Cambodian society and subsequently the NR sector requires intervention at all levels of education. While significant support has been awarded to MoEYS for reforming the educational system, this targets primarily basic education i.e. primary schools. This will eventually result in success, however, the current scenario within the NR and higher educational sectors appears chronic and consequently intervention at these levels should be seriously considered in the short term future.

5.2 Institutional Capacity

A majority of all staff and students from the NR institutions that took part in this assessment have no idea of the function of their employer. While it may appear academic it has crucial implications for most employees from management level to field rangers. Without proper understanding of the institutional mission, function and mandate a manager cannot communicate any clear messages and/or political positions to stakeholders and thus fulfilling their genuine managerial functions. Without a clear understanding of his/her institutional rights and responsibilities a manager conforms to the political structure rather than to NRM tasks that s/he was formally employed to do.

Similarly, a ranger without solid knowledge of his/her organisation's function and mandate will find it extremely difficult to undertake law enforcement activities, as is often experienced in practical projects with a significant law enforcement component. These two examples are supported by the fact that a significant majority of all respondents in this study suggest that "poor governance" is the main threat to Cambodia's natural resources.

The lack of institutional "awareness" is, arguably, influencing the way the organisation is perceived by employees too. Without a certain level of ownership the institution risks becoming a "means to an end" rather than a place that people are proud to be affiliated with. This in turn decreases the feeling of individual responsibility which in turn spurs possible corruption and nepotistic practises.

Box 2:

"Success:
Doing more than we need to
Before we are asked to
Not because we have to
But because we want to."

- John Madsen

Since this survey revealed that most people feel merit should be one of the most important criteria when employing a new staff, and since most people appear quite happy with their current work, there is a rare opportunity to support building a "corporate identity and culture" which looks into increasing the individual's competence, integrity, responsibility and performance.

In this respect it is also important to alter the traditional perception of leadership from a "patronage-client" relationship void of mutual obligations to that of a more contemporary approach. Traditionally, those at the top governed and those at the bottom existed to be governed. All staff who participated in this survey hold medium to high level managerial or lecture positions. These constitute the largest block of decision makers in all institutions and consequently the individual attitude and approach to jobs at this level is paramount to a successful NRM.

The institutional setting in Malaysia, a country with very similar habitat types, allows for the management of approximately 5 km^2 per staff. A comparison with the situation in Cambodia suggests that if the Malaysia example were to be matched, the Forestry Administration would need to increase its staff to 14,780 of which 1,182 should be degree holders (8%). Following the same standard MOE would increase its number of staff to 5,540 of which 443 should be degree holders. Similar trends prevail in the educational sector. Whilst more than 90% of all lecturers at Copenhagen University's Biological Institute hold doctorates the equivalent number for, for example RUPP, is less than 2%.

5.3 Mainstream Disciplines

The research revealed several priority topics in crucial need of capacity building support. These topics constitute mainstream NRM and are addressed in literally *all* donor funded NR projects in Cambodia today.

The topics consist of relatively concise subjects that are generally reliant on technical skills that can be taught at several local institutions and/or within the framework of a project itself. It is, however, crucial to acknowledge that these topics ***cannot be taught during a 3-5 days training course*** as is, unfortunately too often, stated as so-called key outputs in many current capacity building and development projects.

These subjects contain enough material to fill out 3-4 full semesters at most European Universities at graduate level with students already having gone through 2-3 years of undergraduate training. It is unrealistic to believe that training of well qualified NRM can be achieved by providing, at best, sporadic 3-5 days training courses on different localities and in different projects.

Generally, there is a huge need to raise NRM education in Cambodia up to a sufficient technical and analytical level to ensure its valuable contribution to sustainable NRM in Cambodia.

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ANNEX 1: QUESTIONNAIRE

Questionnaire for needs assessment the current NRM qualifications within the Forest and Environment sectors as well as the future educational needs

Q1	Gender	Male	Female					
Q2	Age (approx)							
Q3	Job title and department	Write in full						
Q4	Institution	Write in full						
Q5	Where do you get your education?							
Q6	Number of months or years with this institution							
	Institution related capacity							
Qi7	What is the main mission or function of your institution?	Write in full						
Qi8	How well do you think your organisation/institution fulfils its function?	1	2	3	4	5		
Qi9	Does your organisation have enough staff with the necessary range of skills?	1	2	3	4	5		
Qi10	If there is lack of skilled staff, where are additional staff and training needed? (can circle more than one)	management	technical	accounting	ranger	labourer	fundraising	other
Qi11	Are there good opportunities for promotion in your organisation?	1	2	3	4	5		
Qi12	Does your organisation enable staff to receive additional training?	1	2	3	4	5		
Qi13	Doe your organisation keep a record of which staff have received training or qualifications?	1	2	3	4	5		
Qi14	How important do you think gender equality is for your institution?	1	2	3	4	5		
Qi15	When employing new staff is 'merit' (i.e., their qualifications/ skills/ experience) the primary consideration?	1	2	3	4	5		
Qi16	How well do you think your line manager performs?	1	2	3	4	5		
Qi17	How well do you think your immediate subordinates perform?	1	2	3	4	5		
Qi18	When you first joined this organisation, what kind of degree or other qualifications did you hold?	BSc	Diploma	MSc	Others			
Qi19	When you applied for your current job, were you required to hold a specific degree?	Yes	No					

Qi20	When you applied for your current job, were you required to have some knowledge or experience of NRM?	Yes	No					
Qi21	Upon employment were you given a job TOR?	Yes	No					
	Remarks and suggestions:							

	Job related capacity	Not relevant to my job	Probably relevant to my job - but I don't know much about it	Relevant to my job - I know this well enough to do my job	Relevant to my job - I know this well enough to teach others
	How familiar are you with the following:				
Qj1	Forestry Law (2002)	0	1	2	3
Qj2	Environmental Law ("Law on Environmental Protection and Natural Resource Management") (1996)	0	1	2	3
Qj3	Land Law (2001)	0	1	2	3
Qj4	CITES	0	1	2	3
Qj5	Other?				
	Please assess your knowledge and ability in the following subjects				
Qj6	Basic statistics, such as Mean, Median and statistical tests?	0	1	2	3
Qj7	Data analysis and interpretation?	0	1	2	3
Qj8	Community-based natural resource management	0	1	2	3
Qj9	Identifying forest fire risks and planning fire control	0	1	2	3
Qj10	Writing technical reports	0	1	2	3
Qj11	Making effective oral presentations	0	1	2	3
Qj12	Environmental Impact Assessments	0	1	2	3
Qj13	Assessing use of natural resources by local communities	0	1	2	3
Qj14	Conducting socio-economic surveys	0	1	2	3
Qj15	Participatory Land Use Planning (PLUP, or similar approaches)	0	1	2	3
Qj16	Negotiating conservation agreements with local communities	0	1	2	3
Qj17	Leading or organising surveys of animal diversity	0	1	2	3
Qj18	Leading or organising surveys of plant diversity	0	1	2	3

Qj19	Measuring the density or abundance of a species in a given area	0	1	2	3
Qj20	Designing biological monitoring programmes	0	1	2	3
Qj21	Specifying sustainable quotas for collecting natural resources (e.g., timber, NTFPs)	0	1	2	3
Qj22	Reading maps (e.g., in the field or in a report)	0	1	2	3
Qj23	Map-making (could include sketch-mapping, digital mapping, etc)	0	1	2	3
Qj24	Invasive species control	0	1	2	3
Qj25	Resolving conflicts between people and wildlife	0	1	2	3
Qj26	Developing or evaluating management plans for endangered species	0	1	2	3
Qj27	Practical management of wildlife in captivity	0	1	2	3
Qj28	Practical management of plant nurseries and tree planting	0	1	2	3
Qj29	Preventing soil erosion	0	1	2	3
Qj30	Identifying priority areas for protection	0	1	2	3
Qj31	Leading or directing law enforcement activities in the field	0	1	2	3
Qj32	Ecotourism	0	1	2	3
Qj33	Reading technical reports or books in English	0	1	2	3
Qj34	Carrying out an economic analysis of the use of timber or other natural resources (i.e. calculate income, expenditure, costs and values)	0	1	2	3
Qj36	How well does your current job match with your "dream" job?	Not at all	Slightly	Quite well	Perfect
Qj37	Do you receive additional NRM-related training as part of your job?	Never	Rarely	At least once a year	More than once a year

Analysis related capacity

Qa1	Can you illustrate a typical normal distribution?	yes	no		
Qa2	Can you state the five primary components in a Log-frame?	yes	no		
Qa3	How would you define 'sustainable use'?				
Qa4	What do you consider the greatest threat to Cambodia's natural resources?				
Qa5	Review exercises 1 and 2 and answer the questions attached				
Qa6	In exercise 3 what are the two main information given in the illustration?				

Qa7	Exercise 4 illustrate average temperature in three areas including standard deviation (SD). What can you say about daily temperature pattern in each area?				
	Remarks and suggestions:				

Education related capacity

		Not applicable	Poor				Good
Qe1	How well do you think your education prepared you for your current job?	0	1	2	3	4	5
Qe2	Do you want to work with the same main subject that you are studying?that you have studied?	0	1	2	3	4	5
Qe3	How relevant do you think the courses offered at your educational facility are in relation to NRM?	0	1	2	3	4	5
Qe4	How would you rank the level of teaching at your final institution?	0	1	2	3	4	5
Qe5	What is most important in getting a new job - gradual from 1=connections only to 5=merits only	0	1	2	3	4	5
Qe6	How much do you have to spend on education per month	0	<25	25-100	1-200	2-300	>300
Qe7	What is most important to you in a job?		salary	satisfaction	career	others	
	Remarks and suggestions:						

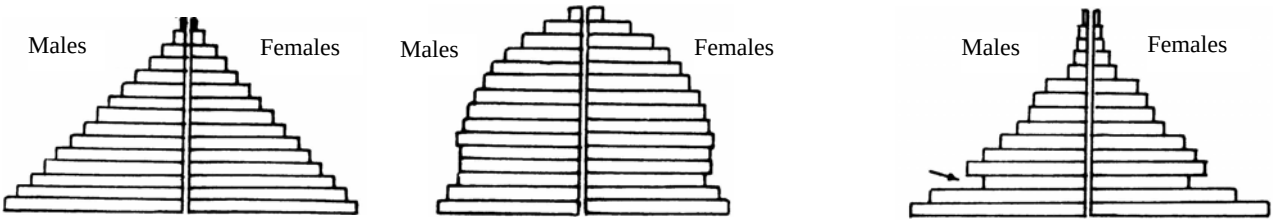
Guidelines for filling out the questionnaire:

- ALL questions have to be answered by every person interviewed. For every question the interviewee has to CIRCLE the answer that he/she find most appropriate.
- Some questions may not be relevant to, for example, a student. For those, we have allowed for the option of circling “not relevant…”
- *Analysis section:*
- The interviewee has 1 minute to draw the normal distribution. If he/she cant, circle “don’t know”. If he/she can, please draw it on the questionnaire.
- The interviewee has 3 minutes to list the five primary components of a log-frame. Please list it on the questionnaire.
- The interviewee has 3 minutes to define “sustainable use”.
- There are two sheets with figures and tables. The interviewee has 7 minutes to complete both sheets, or as much as possible.

ANNEX 2: EXERCISES USED FOR THE ANALYSIS SECTION.

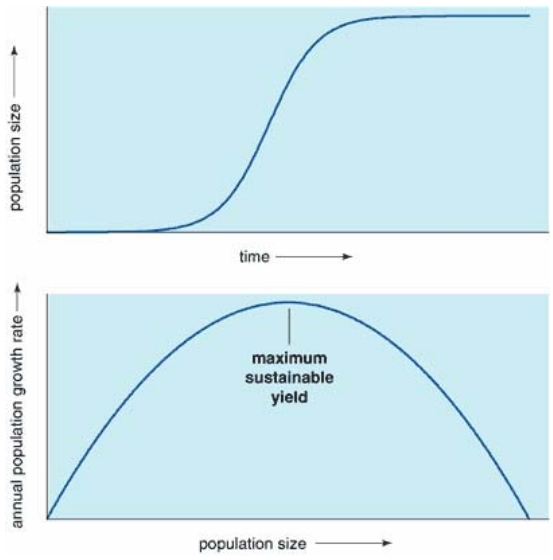
Exercise 1. Population Demographic Structure

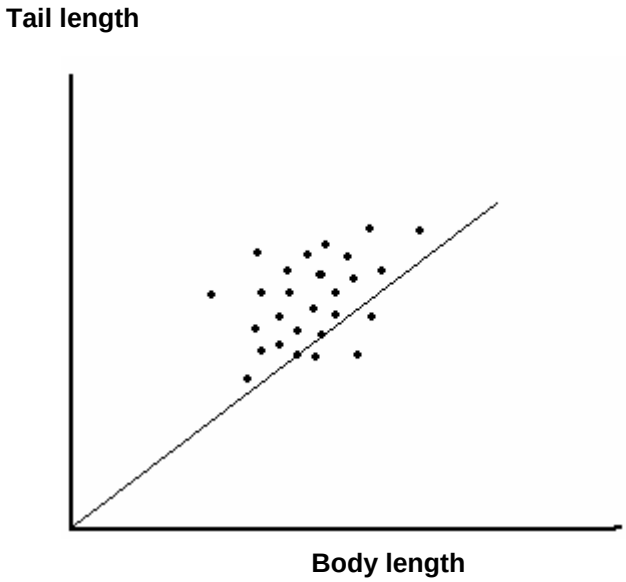
Below is the age/sex structure of three populations. Which of the following populations appears to have declining birth rates? (mark with a circle)



Exercise 2. The Sustainable Yield Concept

What time does the population reach its maximum size? (top graph)
Is the MSY indicated in the correct place? (bottom graph - LEFT)





Exercise 3. The body-length and tail-length relationship of water monitor lizards

.

Exercise 4. The average diurnal temperature from three locations in Cambodia

	Pramoy	Phnom Penh	Banlung
Temperature ^{o}C	30±7.3	30±2.8	30±8.6

ANNEX 3: AVERAGE SCORE OF ALL QUESTIONS

Job, analysis and education related questions ranked in ascending order. The question marked with an *) is calculated based on students reply only.

Qu. No.	Questions	Score (%)	Rank
Qa6	In exercise 3 what are the two main information given in the illustration?	4.02	1
Qa1	Can you illustrate a typical normal distribution?	13.90	2
Qa7	Exercise 1 illustrate average temperature in three areas including standard deviation (SD). What can you say about daily temperature pattern in each area?	17.30	3
Qa2	Can you state the five primary components in a Log-frame?	33.61	4
Qj27	Practical management of wildlife in captivity	38.72	5
Qi7	What is the main mission or function of your institution?	39.13	6
Qj23	Map-making (could include sketch-mapping, digital mapping, etc)	46.97	7
Qj24	Invasive species control	47.83	8
Qj4	CITES	50.63	9
Qj34	Carrying out an economic analysis of the use of timber or other natural resources (i.e. calculate income, expenditure, costs and values)	51.51	10
Qj26	Developing or evaluating management plans for endangered species	54.51	11
Qj25	Resolving conflicts between people and wildlife	55.23	12
Qj20	Designing biological monitoring programmes	56.21	13
Qj3	Land Law (2001)	56.73	14
Qj31	Leading or directing law enforcement activities in the field	57.31	15
Qj17	Leading or organising surveys of animal diversity	58.36	16
Qj21	Specifying sustainable quotas for collecting natural resources (e.g., timber, NTFPs)	59.41	17
Qe7	What is most important in getting a new job - gradual from 1=connections only to 5=merits only	59.61	18
Qj19	Measuring the density or abundance of a species in a given area	59.62	19
Qj15	Participatory Land Use Planning (PLUP, or similar approaches)	59.70	20
Qj9	Identifying forest fire risks and planning fire control	60.08	21
Qj18	Leading or organising surveys of plant diversity	60.30	22
Qj30	Identifying priority areas for protection	60.36	23
Qj16	Negotiating conservation agreements with local communities	61.71	24
Qa5	Review exercises 1 and 2 and answer the questions attached	61.77	25
Qj37	Do you receive additional NRM-related training as part of your job?	62.76	26
Qj6	Basic statistics, such as Mean, Median and statistical tests?	63.16	27
Qj28	Practical management of plant nurseries and tree planting	63.41	28
Qj29	Preventing soil erosion	63.50	29
Qj14	Conducting socio-economic surveys	63.51	30
Qj7	Data analysis and interpretation?	65.38	31
Qj22	Reading maps (e.g., in the field or in a report)	65.78	32
Qa3	How would you define 'sustainable use'?	66.26	33
Qj12	Environmental Impact Assessments	66.54	34
Qj2	Environmental Law ("Law on Environmental Protection and Natural Resource Management") (1996)	66.68	35
Qi9	Does your organisation have enough staff with the necessary range of skills?	67.05	36
Qj32	Ecotourism	67.81	37
Qj10	Writing technical reports	68.09	38
Qi11	Are there good opportunities for promotion in your organisation?	68.92	39
Qj33	Reading technical reports or books in English	68.95	40
Qj1	Forestry Law (2002)	69.35	41
Qe3	How relevant do you think the courses offered at your educational facility are in relation to NRM?	69.80	42

Qi17	How well do you think your immediate subordinates perform?	70.46	43
Qj13	Assessing use of natural resources by local communities	71.72	44
Qj36	How well does your current job match with your "dream" job?	72.97	45
Qj11	Making effective oral presentations	73.11	46
Qe1	How well do you think your education prepared you for your current job?	73.48	47
Qj8	Community-based natural resource management	73.72	48
Qe4	How would you rank the level of teaching at your final institution?	74.78	49
Qi14	How important do you think gender equality is for your institution?	77.49	50
Qi16	How well do you think your line manager performs?	79.01	51
Qi8	How well do you think your organisation/institution fulfils its function?	79.77	52
Qi12	Does your organisation enable staff to receive additional training?	80.77	53
Qi13	Doe your organisation keep a record of which staff have received training or qualifications?	82.51	54
Qe2	Do you want to work with the same main subject that you are studying? that you have studied?	83.48	55
Qi15	When employing new staff is 'merit' (i.e., their qualifications/ skills/ experience) the primary consideration?	87.78	56