Namibia's Biosystematic Needs

From the environment

to the community

Namibia's Biosystematic Needs

Proceedings of the

Namibian Biosystematics End-User Workshop

Windhoek, 24-25 September 2002

Edited by John Irish

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Contents

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Executive summary

Biosystematics is the science of identifying and naming living organisms. At least 16790 different kinds of plants and animals are already known from Namibia. This total represents only a small proportion of what actually occurs, and it is expected that further study will lead to the discovery of many more new species. The Brandberg 'Gladiator' (Mantophasmatodea), which made international headlines in 2002, is indicative of the level of scientific discovery still awaiting Namibian biosystematists.

But biosystematics is not just about science. It is also an essential component of sustainable economic development. Natural resources need to be utilised sustainably, instead of exploited unsustainably. Sustainable utilisation of natural resources needs to be based on sound scientific assessments, including the use of environmental indicators. Where the latter are species, accurate identifications are essential before they can fulfil their function. Biosystematics provides the identifications on which sustainable development can be built.

Namibia's biosystematic services are primarily rendered by the National Museum and the National Herbarium, and secondarily by individuals scattered in other ministries, private citizens, and foreign visiting scientists. Over the years, these National institutions have built up a proud record, but they need continued support to meet the biosystematic demands of a 21st century Namibia. These proceedings represent the results of a participatory process involving wide consultation with all major stakeholders, in which these needs were identified, defined and explored.

First and foremost among these needs are:

- **Consolidation of biosystematic services**. The current fragmentation of these services among three ministries is a colonial legacy that is quite out of pace with modern demands.
- **Infrastructure**. Namibia's valuable biosystematic collections deserve suitable storage space if they are to be optimally utilised now, and preserved for posterity in future. Disused classrooms are not suitable storage space for collections of our national heritage.
- **Staff and Training**. While demands for biosystematic services are increasing, numbers of biosystematists are decreasing. We need to redress the imbalance between service demand and service availability.
- **Information technology and databases**. The vast amounts of biosystematic data can be efficiently managed only by electronic means. As more information becomes available, the need for efficient databases will increase.
- **Library services and literature resources**. Biosystematics is an iterative process that builds on existing information. Literature on Namibian species has often been published overseas and is not readily available in-country. We need to explore innovative ways to make these readily available locally.

The potential costs of meeting the above biosystematic needs are far outweighed by the very real benefits Namibia will reap from having a strong local biosystematic community able to meet its local taxonomic and international biodiversity obligations.

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Mission

NAMIBIAN SELF-SUFFICIENCY IN TERMS OF BIOSYSTEMATIC SERVICES, IN SUPPORT OF ENVIRONMENTAL CONSERVATION AND SUSTAINABLE ECONOMIC DEVELOPMENT, FOR THE BENEFIT OF ALL OUR CITIZENS.

Foreword

Biosystematics in Namibia: perspectives on interacting with the users of biological information generated by taxonomists

Gideon F. Smith*
Workshop Facilitator

**Director: Research and Scientific Services, National Botanical Institute of South Africa, Private Bag X101, Pretoria, 0001 South Africa*

Over the past few years taxonomists have been interacting increasingly with their stakeholders, *i.e*. the end-users of the information they generate. Such a process essentially implies reaching out to the various communities that are served by taxonomists, and ascertaining what they need, as opposed to what taxonomists think their customers need. But make no mistake: this is not as easy a task as it may seem. Indeed, it is a very humbling and sobering experience not only for taxonomists, but certainly also for scientists in general. However, it is a necessary change in the way we have been going about our daily business in museums and herbaria. For, quite simply, as Visser (2000) put it: "Enter the 'stakeholder society': consultation, transparency, corporate governance, accountability and public rights. These are today's maxims. Some are calling it the new corporate agendas and the 'triple bottom line'---integrating financial, social and environmental responsibilities." It therefore came as a refreshing change to have recently witnessed the hosting of the first-ever End-user Workshop initiated by the taxonomic fraternity of Namibia.

It would not be inaccurate to suggest that, at times, scientists generally are somewhat reluctant to interact with the various publics that use, in whatever way, the information, usually transformed into knowledge, that they generate in the course of their activities and initiatives. In some environmental sciences where the value of the end-products is clear, for example activities aimed at enhancing the grazing capacity of natural veld or breeding improved strains of crop plants, it perhaps goes without saying that the research efforts are of importance to humankind. In vivid contrast, initiatives to adequately document the biodiversity of a country, a region, or even at the global scale, are often frowned upon as, at best, an activity to be marginally tolerated, and at worst, as the somewhat eccentric efforts of a group of scientists who do little more than sift through dusty collections of biological material.

There is an increasing awareness among biologists that some rather one-sided perceptions regarding their willingness to participate extensively in the broader environmental movement would seem to indicate that they prefer to operate independently. However, as biologists, particularly taxonomists and systematists, reach out to their various stakeholder communities, a perfect opportunity is presented to now create new and enhance existing, mutually beneficial partnerships. But this will remain little more than a good idea if action is not taken. Indeed, once a Business Plan based on the outcomes of the Workshop has been established and agreed upon, the various roll-out phases must be initiated, conducted and concluded. Fortunately it can be confidently anticipated that Namibian taxonomists will rise to the challenges and opportunities presented by this post-Workshop period, without falling into the trap of attempting to be everything to everyone. Realistically, the initial execution phase will necessarily result in a prioritisation process, with considerable emphasis on areas of critical importance to the successful implementation of achievable activities that will benefit taxonomic collections and the dwindling number of staff able to curate them and to provide services based on them. It is of course imperative that taxonomists must be able to count on the support of their colleagues in related disciplines if this (re)prioritisation process is to be successful. This is particularly important if the creation of mutually beneficial partnerships is to be achieved. Most importantly, it is up to taxonomists to initiate the building of bridges to foster innovative partnerships and networks. Taking charge of the situation now will ensure equal participation and competitiveness in the national, indeed the global, environmental scientific framework.

Although Namibia harbours numerous diverse and wide ranges of plant and animal habitats, it is perhaps best known as an arid paradise, particularly as a result of its diverse and unique desert landscapes with their associated fauna and flora (Pallet 1995; Van Wyk & Smith 2001). As one example, the

country is host to over 4 200 plant species, a number of which are endemic to its arid areas and adjacent, more mesic habitats (Maggs *et al*. 1998; Craven 1999). With these immensely rich natural resources, of course, comes considerable responsibility to study and manage them adequately. Admirably, Namibia has made significant strides towards mapping out the future of its endeavours in the field of biodiversity science. For example, it was one of the first, and still is one of only a few, southern African countries that have produced a keystone country study on its biological diversity (Barnard 1998; see also papers included in Volume 7[4] of *Biodiversity and Conservation*). More recently, following an extensive participatory process, Government of Namibia (2002) produced Namibia's 10-year strategic plan of action for sustainable development through biodiversity conservation. This document, also known as the country's National Biodiversity Strategy and Action Plan (NBSAP), outlines the priorities for protecting ecosystems, biological diversity and ecological processes through conservation and sustainable use. In addition, the electronic dissemination of environmental information has received considerable attention recently (Smith *et al*., 2003) and it therefore comes as no surprise that also in Namibia this rapidly emerging and developing field is receiving considerable attention from various environmental monitoring perspectives (Noongo *et al*. 2002). These, and other, activities bode well for future initiatives aimed at comprehensively documenting the in-country biological diversity, among other things through supporting its collections infrastructures.

The conclusion of the Namibian End-user Workshop should not be seen as the end of the consultation activity, nor even as the end of a process. It is much rather the beginning of an era during which taxonomists and biodiversity specialists can and should ascertain and spell out the requirements needed to maximally optimise the conditions under which they can contribute to the in-country environmental science and technology thrusts. For one, there must be an increasingly entrenched world view that understands and supports the reality that taxonomy requires adequate resources within an enabling environment to deliver on the activities that make taxonomists indispensable participants in the conservation, sustainable use and beneficiation of biological resources.

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Pachypodium namaquanum, the 'halfmens', is one of Namibia's 4269 plant species.

Acknowledgements

We gratefully thank the following for their support:

- The workshop was an initiative of the Biosystematics Working Group of the Namibian National Biodiversity Programme, which is funded by the Government of Germany through the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ).
- The workshop, an activity also planned under the Southern African Botanical Diversity Network (SABONET) Project, was funded by the Global Environment Facility (GEF), through the United Nations Development Programme (UNDP).
- The hosting institutions, The National Botanical Research Institute and the National Museum of Namibia, gave generously of their staff's time and expertise.
- The National Botanical Institute, South Africa, graciously loaned Prof. Gideon Smith to us as facilitator, and his air fare was donated by the Sustainable Animal and Range Development Programme (SARDEP), another GTZ initiative.
- Local stationary emporium Waltons kept us writing in style.
- Namibia Breweries Limited ensured that thirsty delegates at the end of the day did not stay so.
- Heja Game Lodge ran the workshop like a well-oiled machine, letting us concentrate on the job in hand.

*****

Introduction

John Irish
Biosystematics Co-ordinator

The Biosystematics Working Group (BWG) of the National Biodiversity Programme (Namibia's CBD-implementing agency), has as one of its aims to determine and respond to the needs of the users of biosystematic information in Namibia. The Southern African Botanical Diversity Network, SABONET, held a workshop to determine the needs of botanical user in South Africa during February 2002 (Steenkamp & Smith, 2002). This was to be followed by national workshops in other SABONET countries. Given the small size of the biosystematic community in Namibia, it was considered more productive to have a single user needs assessment for SABONET and the BWG combined, rather than different botanical and zoological assessments. SABONET's National Working Group responded positively to this suggestion, and the resultant Namibian Biosystematics End-User Workshop was held on 24-25 September 2002 near Windhoek. We were privileged to draw on the experience of the facilitator of the South African workshop, Prof. Gideon Smith, in facilitating our own workshop, too.

Delegates were representative of a broad spectrum of stakeholders, including a variety of central government departments, local government, non-governmental organisations, private enterprises, tertiary educational institutions, and individuals. Namibia's two primary biosystematic provider institutions, the National Museum and National Herbarium of Namibia, were also represented, since biosystematic providers are themselves users of biosystematic information. The workshop resulted in a prioritised list of user needs. At subsequent meetings on 3 and 19 March 2003, providers (now wearing their provider hats) assessed the implications for provider institutions of meeting those needs. The end result is the roadmap for biosystematic development presented here.

These proceedings are dedicated to the members of the Biosystematics Working Group who gave their unfailing support before, during, and after the workshop, and without whom it would not have been successful, or even possible. I thank all participants for their enthusiasm and dedication.

Some terminology
We devised the following working definitions and provided them to workshop participants in order to simplify discussions:

- Taxonomy: describing and naming new species
- Biosystematics: the context of taxonomy; *i.e.* classification, biogeography, phylogeny.

- Primary, taxonomic, products:
  Species descriptions and revisions of higher taxa.
  Specialist identifications
- Secondary, biosystematic, products:
  Checklists
  Identification guides
  Red Data lists
  Popular publications
  Educational products
  etc.

Stakeholder categories (participants were asked to categorise themselves):
- *Primary Producers*. The creators of primary taxonomic information (taxonomists).
- *Primary Consumers (= Secondary Producers)*. Users who require high level primary taxonomic information, and use this to produce secondary biosystematic products.
- *Secondary Consumers*. Users who require high level primary taxonomic information, but do not produce biosystematic products (e.g. EIA consultants, law-enforcement, phytosanitary services).
- *Tertiary Consumers*. Users who require more generalised biosystematic information only (e.g. public, educators, tourism industry).

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Opening remarks

Dr. Paul Jessen
Acting Director, Agricultural Research and Training
Ministry of Agriculture, Water and Rural Development

Welcome to all! Without you we would not have been able to hold this workshop.
A special word of welcome to:

- Ms Jacqui Badcock - UNDP Representative. The workshop is an initiative of the Biosystematics Working Group of the National Biodiversity Task Force, and it is funded by UNDP through SABONET
- Prof. Gideon Smith - Facilitator
- Representatives from the National Museum, MET, MFMR, DRFN, NFSI, UNAM, Polytechnic, NEEN, Enviroscience, Eco-plan, Tree Atlas, NRC, FENATA and colleagues from MAWRD

I want to use the opportunity of opening this workshop, to remind you that you are engaged in narrowing the information /knowledge gap.

A renowned world economist, Prof. Stephane Garelli during a series of presentations during 1993, said: "It takes only two years to reverse an economic deficit, but 10 years to reverse an technology deficit and 20 years to reverse a deficit in knowledge and training."

One of the issues that is hindering farmers from increasing their efficiency is information or knowledge. The developed countries of the world have seen this and have developed a system in assuring that their population is supplied with information, so that informed decisions can be taken. This system is the Internet. It is also accessible to Namibians, but we need to keep the following in mind.

Statistics concerning the knowledge gap:

- A computer costs the average Bangladeshi 8 years' income; an American, 1 month's income.
- The number of Internet connections worldwide rose from 100,000 in 1988 to 36 million in 1998.
- 80% of web sites are in English, but only 1 in 10 people in the world speak English.
- The United States of America has more computers than the rest of the world put together.
- South Asia has 23% of the world population but only 1% of the world's Internet users.

Profile of a typical Internet user:

- High income
- Under 35 years old
- Urban based
- University degree
- English speaking

This workshop is about bringing together the primary, secondary and tertiary consumers and the primary producers of biosystematic information in Namibia. We already have much information. By managing this information effectively it can become a powerful tool for development and play a role in narrowing the information/knowledge gap referred to above. I wish you all very fruitful discussions over the two days and may we try and bring the information to the people that really need it.

Thank You

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Opening remarks at the Biosystematics Workshop

Heja Lodge
24-25 September 2002

1

- Welcome to all
- Without you we would not have been able to hold this workshop
- Special word of welcome to:
- Ms Jacqui Badcock - UNDP Representative
- An initiative of the Biosystematics Group of the National Bio-diversity Task Force - Workshop is funded by UNDP through SABONET
- Prof Gideon Smith - Facilitator
- Representatives from: National Museum, MET, MFMR, DRFN, NFSI, UNAM, Polytechnic, NEEN, Enviro-science, Eco-plan, Tree Atlas, NRC, FENATA and the colleagues from MAWRD

2

Introduction

Narrowing of the information /knowledge gap:

- A renowned world economist, Prof. Stephane Garelli during a series of presentations during 1993, said that " It takes only two years to reverse an economic deficit, but 10 years to reverse an technology deficit and 20 years to reverse a deficit in knowledge and training"

3

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4

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5

- The profile of a typical Internet user:

- High income
- Under 35 years old
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- University degree
- English speaking

6

- The workshop is about bringing together the primary, secondary and tertiary consumers and the primary providers
- Once again the managing of information which is so powerful
- I wish you all very fruitful discussions over the two days and may we try and bring the information to the people that really need it

7

Thank you

8

Donor statement

Dr. Jacqui Badcock
Resident Representative
United Nations Development Programme

Thank you very much for inviting me to speak on this occasion. Thank you also to Mr Jessen for the inspiring opening remark.

One of the things on my must-do-list during my stay in Namibia is to visit the Sperrgebiet and the Namaqualand in September. I've just missed it this year, but I am hoping for a chance next year. I was stunned to learn that the ten countries our Southern Africa Botanical Network, or SABONET project supports cover less than 2% of the world's land area, yet they contain over 10% of the scientifically described global flora, i.e. over 30,000 species.

This area also includes two biodiversity hot spots, designated by Conservation International, namely the Succulent Karoo and the Cape Floristic Province. What these facts mean is that Namibia is not only a paradise for many flora and fauna but also is an extremely important treasure box for humanity.

Human health and well being are directly dependent on biodiversity. For example, 10 of the world's top-selling drugs in 1997 were derived from natural resources. The global market value of pharmaceuticals derived from natural genetic resources is estimated at US$75000 – 150000 million annually. Some 75 percent of the world's population relies for health care on traditional medicines which are derived directly from natural sources.

Biodiversity also provides genetic resources for food and agriculture, and therefore constitutes the biological basis for world food security and support for human livelihoods. A number of wild crop relatives are of great importance to national and global economics. For example, Ethiopian varieties have provided protection from viral pathogens to California's barley crop, worth US$160 million per year. Genetic resistance to disease obtained from wild wheat varieties in Turkey has been valued at US$50 million per year.

Yet, nobody knows exactly how many species there are in the world. Estimates say 5 million to 30 million. Of that only 1.75 million have been scientifically described so far. What we know for sure is that human activities are eliminating some thousands of species every year. Scientists believe that as much as a quarter of all plant species could disappear within the next 50 years.

Given the importance of biodiversity, it is vital that the essential botanical information is collected, evaluated and monitored effectively. It is also vital that the information is actually used by institutions and individuals in order to understand environmental changes, mitigate disappearance of species, plan farming and gardening, or help individuals and organisations pursue study or outdoor activities. For this, the role of botanical institutions such as herbaria and botanical gardens is becoming increasingly important. They are now the driving force for botanical biodiversity conservation worldwide.

One example I would like to share with you is a unique programme called Seed Guardians initiated by the Henry Doubleday Research Association based at the Ryton Organic Gardens in the UK. In order to conserve old varieties of vegetables and fruits that cannot be marketed under an EU directive and are therefore disappearing, the Seed Guardian programme provides free seeds to volunteer guardians to grow the vanishing varieties in their backyard. The volunteer guardians then collect seeds and return the multiplied number of seeds to the Seed Bank. In this way, keen gardeners can enjoy raising white egg plants and yellow tomatoes, as well as contributing to awareness raising on the importance of having many varieties of foods and to their actual conservation.

In closing, I must say that it has been a great pleasure to support the SABONET Project. It is one of the most smoothly run projects I have encountered and has a very strong and effective secretariat based in Pretoria. I must also say that the Namibian counterpart, the National Botanical Research Institute, has also been marvellous, setting a shining example among the 10 participating countries of the SABONET

project. It was the first country to finalise the plant checklist as well as the red data book and the staff have been contributing actively to the SABONET News, which I enjoy a lot.

At this juncture, I wish you all fruitful deliberations and hope that this workshop will be a major step forward to establishing an innovative approach for conservation and will enhance linkage between botanical institutions and the rest of Namibia.

*****

Participants

Workshop participants. Standing, left to right: Tapio Reinikainen, Barbara Curtis, Davies Lutombi, Herta Kolberg, Martin Mbewe, Chris Hines, Lisias Tjaveondja, Anthony Watkins, Eugène Marais, Jacques Els, Peter Erb, Dave Joubert, Antje Burke, Sonja Schubert, Tharina Bird, Remmie Moses, Mike Griffin, Marianne Uiras, Gillian Maggs-Kölling, Silke Bartsch, Tuhafeni Sheuyange, Basil van Rooyen.
Sitting, left to right: Phoebe Barnard, John Irish, Hartmut Kölling, Midori Paxton, Gideon Smith, Niko Kisting, Esmerialda Klaassen, Sonja Loots, Salomé Kruger.

1. MAIN USER WORKSHOP
24-25 September 2002

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2. ADDITIONAL INPUT
individually solicited immediately afterwards from key people who were unable to attend the workshop

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3. PROVIDER MEETINGS
3 and 19 March 2003

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Ms. Tharina Bird
Mr. Seth Eiseb

Ms. Alushe Hitula
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Mr. Ashley Kirk-Spriggs
Ms. Esmerialda Klaassen
Dr. Gillian Maggs-Kölling
Ms. Coleen Mannheimer
Mr. Eugène Marais
Ms. Marianne Uiras

4. REVIEWERS
who helped beat the final product into shape

Ms. Silke Bartsch
Ms. Tharina Bird
Mr. Mike Griffin
Ms. Esmerialda Klaassen
Mr. Davies Lutombi
Ms. Coleen Mannheimer
Mr. Eugène Marais
Dr. Gillian Maggs-Kölling
Ms. Sonja Schubert
Prof. Gideon Smith
Ms. Marianne Uiras

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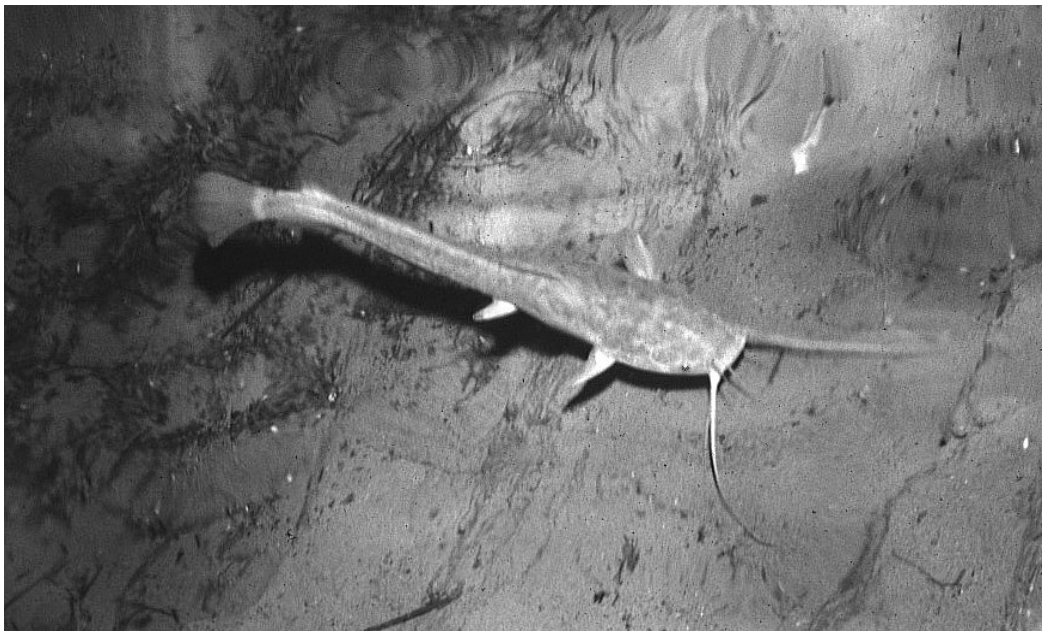


Clarias gariepinus, the common catfish or barbel, is one of 697 fish species found in Namibian waters.

Workshop programme

Biosystematics User Workshop, 24-25 September 2002

Programme

Venue: Heja Game Lodge, Airport Road, ca. 21 km East of Windhoek

24 September

08h00 – 08h30: Registration, pre-workshop questionnaire, welcome coffee

1. **Official opening** (Mr. Paul Jessen, Acting Director, Agricultural Research and Training)

2. **Global context** / donor statement (Dr. Jacqui Badcock, Resident UNDP Representative)

3. **Introductory session**:

3.1. Background and Purpose of Workshop: 'Systematics and Society – Challenges for the 21sst Century' (Prof. Gideon Smith, National Botanical Institute, Pretoria - Facilitator)

3.2. Local context: Presentations by Namibian primary biosystematic service providers
- National Herbarium (Mss Esmerialda Klaassen & Coleen Mannheimer)
- National Museum of Namibia (Mr. Eugène Marais)

3.3. Brief question and answer session
3.4. Workshop arrangements / practical matters

10h30-11h00: Coffee/tea

4. **Breakaway session 1** (divided up per user categories)

4.1. **Primary consumers,** and **Secondary + Tertiary consumers** (two groups)
What biosystematic information do we already have?
Needs: What biosystematic information do we additionally need?
One-off products
Products that require regular updating
For each product: who are the likely users; Is this a general need, or restricted to one stakeholder only?
For each: What format(s) do we need the information in?
Prioritisation: Once we have a list of needs: What basis will we use to prioritise this?
Result: list of priorities / mechanism for prioritisation
Dissemination: What routes are available to disseminate this information from producer to stakeholder?
What are the constraints of the different delivery routes?
Problems: What problems do we currently encounter with regard to obtaining / extracting / accessing the information we need? How then can the current system be improved?
Miscellaneous: Any other issues that need to be addressed?

4.2. **Primary producer institutions**

Needs: What *taxonomic* products do we ourselves need in order to deliver a more effective taxonomic service?
What additional infrastructure / equipment do we need to cater for *current* user needs? How do efforts to obtain infrastructure / equipment influence our ability to address user needs?
What human resources do we need? How do we ensure continuity of services?
What else do we need, e.g., what is the enabling environment (policies, funding, infrastructure)?

Prioritisation: What criteria should we use to prioritise user requests on a day to day basis? In our forward planning (continued baseline taxonomy): What criteria should we use to select and prioritise target taxa and areas?
Unmandated organisms (not currently catered for in Namibia): Who should take responsibility for them? What additional needs arise from taking responsibility for them?
How do we obtain all these things we need?
What are the time frames we need to consider for which kinds of information supply?
Miscellaneous: Any other issues that need to be addressed?

13h00-13h45: Lunch

5. **Breakaway session 2**
Continuation of session 1

15h30-15h45: Coffee/tea

6. Concluding, combined session
Brief report back by each breakaway group, general discussion and commentary.
Post-workshop questionnaires

7. Thanks
ca. 17h30: End of formal proceedings for day 1

8. Evening: Braai
Resulting in numerous informal discussions and synergies

25 September

08h00-08h15: Coffee

1. **Combined session**: **Putting it all together** or, **How are we going to get all this done?**

Feedback and additional ideas developed from evening synergy

Needs lists: how do we combine them into a single prioritised needs list?
What dependencies are there (things that need to be completed before others can be started)?
Once we have the single needs list: Who should do what? What are primary and secondary producer responsibilities respectively? Is there perhaps anything that is not a biosystematic responsibility at all?
Where are we going to get money to do this?
What mechanisms can we use to ensure ongoing exchange between producers and stakeholders, in order to allow biosystematic capacity development within Namibia?

10h30-11h00: Coffee/tea
13h00-13h45: Lunch
15h30-15h45: Coffee/tea
as long as it takes ….

2. Concluding statements

3. Thanks
End of main workshop

4. **Short post-workshop session** for primary producer institutions only:
Is yesterday's assessment of our own needs still valid, or does it need to be modified in the light of today's proceedings?
Now that we know what our users need, where do we go from here? How do we keep this initiative alive?

*****

Presentations by Biosystematic Service providers

1. National Herbarium of Namibia

Coleen Mannheimer
Curator
National Herbarium of Namibia

Summary (overall background)
The National Herbarium of Namibia (international acronym 'WIND') is a section of the National Botanical Research Institute, NBRI, itself part of the Ministry of Agriculture, Water and Rural Development, MAWRD. WIND, and to a lesser extent NBRI, fits rather awkwardly in MAWRD, as many of its functions do not directly affect the communal farmer who is MAWRD's primary focus. The herbarium focuses on Namibia, and houses about 76000 dry mounted plant specimens.

Besides normal herbarium functions (curation, research, identification and information services), WIND staff get called upon to perform more general botanical duties, too: a reflection of the dearth of botanists in Namibia. Current staffing is adequate thanks to supplementary posts provided through SABONET, but the situation will deteriorate when SABONET posts expire in the near future, if currently vacant permanent posts are not filled.

Major problems and constraints that face the herbarium relate to human resources (training and recruitment problems), infrastructure (equipment and physical archiving space), isolation (including limited access to literature), and limited communication with users. Of the two national biosystematics institutions, the herbarium has the more modern facilities.

Major needs parallel the constraints, and call for better training and recruitment, more space, and better communication with users.

and

Esmerialda Klaassen
Database Manager
National Herbarium of Namibia

Summary (database management)
Databasing of the WIND collection was completed during 2002. The database has 126 435 records, including 55 609 Namibian records repatriated from PRE (National Botanical Institute, Pretoria). IT infrastructure is adequate, but expected to become problematical as demand for data increases. Data access is regulated by overall MAWRD policy, which is probably not ideal for the purpose. Some classes of information may not be provided, Permanent Secretary approval is needed for other, and definitive feedback is expected. There are two different databases: one with specimen-related information and one with taxon-related information. Several products have already been based on these databases, or are in the process of being developed.

Constraints and problems include inadequately trained staff and staff shortages, usability problems, an absence of quality control, and unrealistic user expectations. Keeping up with advancing technology is also a problem. Future plans include a web site and incorporation of photographs and maps in the database.

*****

The National Herbarium of Namibia

- Established 1953
- First full-time curator appointed 1957
- Served until 1975, intervening years important in terms of growth of the collection and publication of *Prodromus FSWA*
- Succeeded by M. Müller-WIND then occupied "camel stables"
- 1985 to 1996 unsettled, collection packed up several times, staff scattered
- 1996 present premises occupied

1

Institutional structure

Section of the National Botanical Research Institute, residing under the Ministry of Agriculture, Water and Rural Development

- Ministry has opted for the Farming Systems Research and Extension (FSRE) approach, which they feel will best benefit the communal farmer
- To a certain extent the National Herbarium sits awkwardly within this system, as many functions do not directly affect the communal farmer

2

- Scope is national, collection mainly Namibian with a few specimens from neighbouring countries
- Collection composed largely of dried and mounted plant specimens - at present ± 76 000

3

Activities

- Identification service
- Curation
- Information service
- Fieldwork
- Training
- *Ad hoc* activities that fall to us due to the lack of botanists in Namibia
- Research

4

Present staffing

- GRN
  - SABONET

- 1 Senior researcher (post vacant)
- 2 entry-level researchers (1 post vacant)
- 4 technicians
- 2 technical assistant

  - 1 researcher
  - 1 data loader
  - 1 data cleaner
  - 1 herbarium assistant

5

Problems and constraints - SABONET has made a difference

- Isolation
- Insufficient staff, recruitment problems
- Lack of staff training/expertise
- Lack of equipment
- Limited access to literature
- User perceptions and expectations
- Lack of consultation and communication between us and users
- Space is becoming a constraint

6

What do we need?

- Better consultation, communication and cooperation between us and users
- Better recruitment material from local training institutions
- strengthening of botanical expertise at MET, UNAM
- more space
- appropriate recruiting procedures

7

Database Management within WIND

Background:

- encoding of collection start **1997**
- total records: **126 435**
- repatriated **55 609** Namibian records from PRE (1999 & 2002)
- complete encoding national collection **2002** (not quality controlled)

1

Operational infrastructure

- exclusive network
- 4 computers
- 1 datacapturer (SABONET)
- Database Manager
- WIND information policy
- Databases: SPMNDB; Flora Database

2

Information access policy

WIND policy fall within guidelines of MAWRD policy

- Conditions:
  - info provided for specific purpose only
  - sensitive info not provided
  - source of info should be acknowledged
  - feedback expected (publications; draft copies)
  - prioritise depending on available manpower
  - non-compliance leads to denial of future requests

3

Information access policy cont.

- Procedure:
  - apply well in advance
  - request submitted to head of institute
  - specify:
    - what info required
    - what questions to be answered
    - what purpose to be used for
    - when info required

4

Information access policy cont.

- Prioritisation:
  - Primary users: NBRI staff; MAWRD; *bona fide* researchers; consultants for MAWRD
  - Secondary users: consultants (PS approval)
  - Not prioritised: ad hoc members of the public

5

Services available

- SPMNDB:
  - Species list in variety of formats (per region, per grid, per family/genus/species)
  - Query database
- Flora Database:
  - taxon related information (common name, distribution, ethnobotany, RDL status, etc.)

6

Outputs

- A Checklist of Namibian Plant Species
- Cyperaceae of Namibia: an identification manual
- Water Plants of Namibia: an identification manual
- Checklist of grasses in Namibia (in prep.)

7

Information requests

- "Read only"
  - Internal:
    - RDL
    - Common names
    - Taxonomic queries
    - Distribution
    - Affiliated porjects: TAP
  - External:
    - EIA

8

Information requests cont.

- 2000 - 2002:
  - species lists: rescue missions; affiliated projects; EIA; consultants
  - distribution
  - endemics
  - protected species
  - planning for fieldtrips
  - endemic taxa in conservancies
  - propagation of species

9

Constraints

- trained staff not committed
- not all staff trained
- quality control of data
- unrealistic expectations of users
- Flora Database not very user friendly
- duties of information officer terminated

10

Future

- Web-site
- Flora Database with linked photographs & maps
- Flora Database more user friendly
- open day
- provide interpreted data only

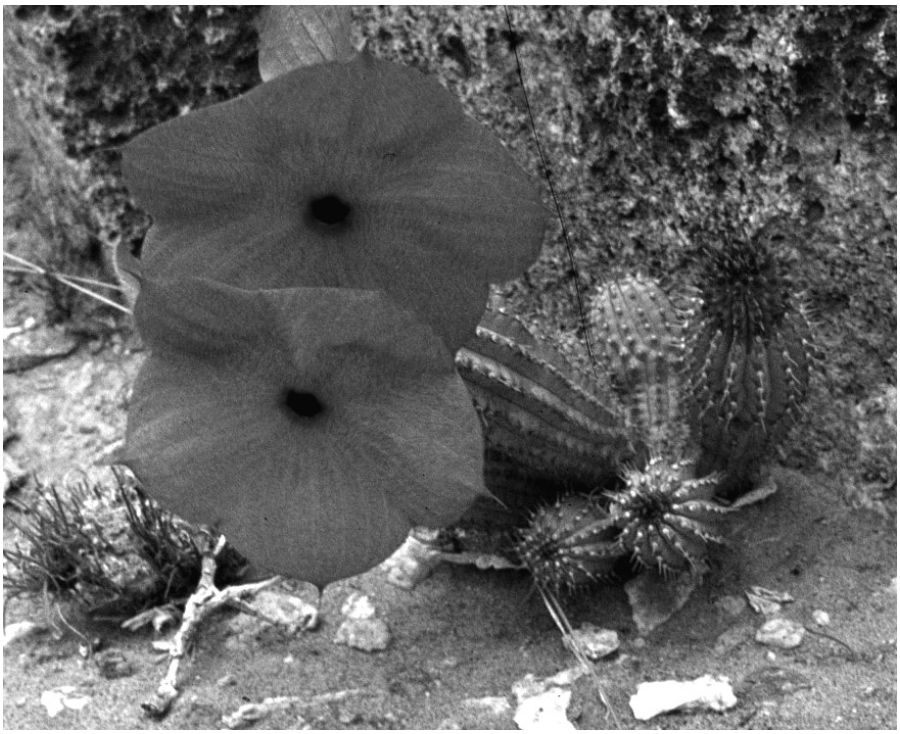
11

Constraints

- SABONET drawing to a close
- trouble shooting of SPMNDB minimised
- development in technology
- MAPPIT vs GIS
- qualified personnel

12

*****



Hoodia currorii, or 'ghaap', a Namibian plant that is currently the focus of pharmaceutical bio-prospecting, as well as traditional knowledge claims.

2. National Museum of Namibia

Eugène Marais
Senior Curator, Natural History
National Museum of Namibia

Summary
The National Museum of Namibia is a division under the Directorate of Cultural Heritage within the Ministry of Basic Education, Sport and Culture, MBESC. It includes both Social and Natural Science arms, and especially the latter fits rather awkwardly in MBESC, where the focus is on schooling and education. Staff levels are currently inadequate, with multiple unfilled professional posts. Infrastructure is also inadequate, with collections housed in a former school building.

Besides external and government policies, the museum is subject to a number of internal policies that govern its activities. Museum activities are guided by a recently implemented five year plan with specific end goals based on the museum's own assessment of the current situation and likely future resources and capacity, and driven by priorities based on recurrent user requests. It is also active in many international programmes. The museum is willing to develop capacity where none exists, but requires user guidance for this.

Known biological diversity in Namibia comprises at least 12 059 species, of which 75% are not plants (i.e. broadly the museum's responsibility), and 48% are insects (the responsibility of a single museum department).

Because of current resource constraints, the museum cannot meet all expectations. Its obligations exceed its capacity, therefore it has had to focus primarily on previously successful or nationally important activities. The situation is unlikely to improve soon. It is a minor, non-critical unit within the MBESC, yet user expectations keep rising for specialised services in disciplines only represented at the museum. Chronic personnel shortages are exacerbated by the difficulty of recruiting and retaining qualified personnel. Creeping obsolescence and lack of maintenance funding erode infrastructure capacity. The inappropriateness of Government financial regulations to the purchase of scientific equipment creates problems.

Changes may be brought about by proven user demand, direct user investment, major changes within MBESC, donor support, or the forging of strategic partnerships with stakeholders.

*****

Comicus arenarius, an endemic Namibian cricket, and one of more than 8104 known Namibian insects.

Governance

Museum structure was designed for operation as a self-contained semi-autonomous institution (1993).

Structure revised and current scheme implemented late 2001.

- Ministry of Basic Education, Sport & Culture
  - Department of Adult Education & Lifelong Learning
    - Directorate of Cultural Heritage
      - Division National Museum of Namibia
        - Social Science
        - Natural Science
        - Extension & Information
      - Division Cultural Programmes
      - National Monuments Council

1

Structure

Staff

Vertebrates
Senior Curator
3 x Curators

Technician
2 x Technical Assistants

Invertebrates
Senior Curator
3 x Curators

Technician
2 x Technical Assistants

- National Museum of Namibia
  Deputy Director
  - Natural Science Chief Curator
    - Vertebrates
      - Birds
      - Fishes
      - Mammals
      - Reptiles
    - Invertebrates
      - Spiders
      - Insects
      - Other groups
  - Social Science Chief Curator
  - General Services
  - Extension & Information Chief Curator
    - Information Services
    - Extension Services
    - Display Services

2

Functions

Mission:
To preserve, understand and explain the national heritage of Namibia

Functional Units

Social Sciences
Anthropology
Archaeology
History

Natural History
Arachnology
Entomology
Other Invertebrates
Lower Vertebrates
Ornithology
Mammalogy

Reference Library

Extension (Mobile Museum Service)

Display Centers
Alte Feste
Owela
*Independence

Main Functions

Collecting: systematically collect and document representative objects, specimens and information relevant to the cultural and natural heritage of Namibia.

Curation: curate material in its care through accessioning; restoring where necessary; preserving; providing suitable, secure accommodation; and preventing damage, deterioration and loss.

Research: record, describe, report, interpret, and/or explain Namibia's natural and cultural heritage by undertaking and encouraging research in particular fields of expertise.

Promotion: promote the National Museum's resources and Namibian Heritage though public displays, activity programmes, controlled access to the collections and loans to the scientific community.

Dissemination: disseminate knowledge for the benefit of Namibia, all people, and the international scientific community.

Operational policy provides ethical guidelines and explains staff responsibilities
Specialist units set goals, objectives, and operational guidelines within general framework
Annual work plans schedule activities and set milestones
Annual budget provides resources

3

Planning

Mission:
To preserve, understand and explain the national heritage of Namibia

Natural History Priorities

Collections
Care of voucher material
Core Information
Adequate reference library
Databases
Improve info access
Training
Ensuring training to staff, students, others
Access
Improving info delivery
Publication
Provide info outlets
Inventory
Cumulative info gathering
Expertise
Provide specialist support
Cooperation
Promoting interest and interaction

National Museum Planning 2002 - 2007

Goals	Objectives
Efficient management	• Revise policies and operational procedures • Improve staff training • Continue collection maintenance
Quality service and information	• Improve exhibitions • Continue Museum publications • Provide specialized information services • Revise Museum educational services

Planning parameters

Development planning is based on internal assessment of current situation, likely resources and predicted expectations
Development of client services is based on priorities resulting from recurrent user requests and likely capacity
External prescriptions and recommendations only provide guidelines

Message: **If you don't ask, we do not know. If we cannot supply, we can develop**

4

History

Collection Sizes

Anthropology (12 k)
Archaeology (350 k)
History (5 k)

Natural History
Arachnology (14.5 k)
Entomology (140 k)
Other Invertebrates (1 k)
Ichthyology (3.5 k)
Amphibians (1.3 k)
Herpetology (9 k)
Ornithology (8.2 k)
Mammalogy (15 k)
Tissue & DNA (3k)

Reference Library
Books (8 k)
Current periodicals (600)

Brief Chronology

1891 Schutztruppe instructed to collect items of interest
1901 Local botany collection started
1907 *Landesmuseum* created by German governor Von Linquist
1909 First public displays
1918 WW1 ends, most collections lost
1926 Delegated as *South West Africa Museum* to Scientific Society
1957 Renamed *State Museum* when Administration resumed control
1961 Natural history component established
1969 Transferred to the SA Department of National Education
1978 Transferred to the SWA Department of National Education
1995 Renamed *National Museum of Namibia*

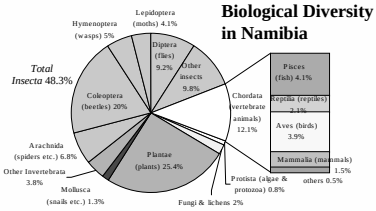
5

Natural History

Known diversity (species numbers)

Monera (bacteria)	n.d.
Protista	133
Fun/Lich.	329
Plantae	4269
Mollusca	218
o. Invertebrata	636
Arachnida	1143
Insecta	8104
Pisces	697
Reptilia	273
Aves	649
Mammalia	256
o. Chordata	83

Biological Diversity in Namibia



6

Policies

International contact for:

ICOM
ICCROM
AFRICOM
SADCAMM
SAMP
SAFRINET
GTI

External Policy examples

Budgets - Ministry of Finance & National Assembly / National Council
Programmes - Ministry of Basic Education & 5-year NDP
- Ministry goals of ***access, equity, quality, efficiency***

Personnel - Public Service Commission and Prime Minister's Office
Focus - National Policy on Arts & Culture 2001
- Safeguard, promote and extend Namibia's physical, linguistic and spiritual heritage
- Namibian repository for faunal voucher specimens

Legal - No special legal status

7

Internal Policies

Existing Policies

Collection development
Collection donations
Collection loans
Information access
Research associates
Staff development
Tissue & DNA research

Example:
Partnership & project policy

Institutional participation when directly related to Museum areas of interest

- No resources to support activities indirectly related to Museum concerns.
- Degree of involvement through a balance of resources, requirements, and relevance
- Staff is encouraged to have research projects on individual interests and priorities within their disciplines
- Individual research subject to Museum policies, functions, resources or interests
- Museum concerns have priority over individual interests

8

Work profile

Museum presently cannot meet all expectations

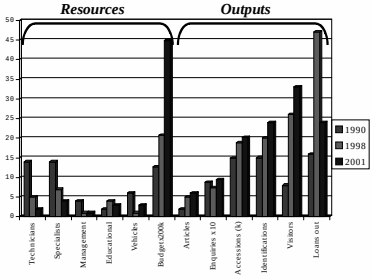
Obligations exceed capacity

Focus on successful and nationally important activities

Natural history represents already considerable commitment

New or more activities require new (external) resources

Productivity



9

Frame conditions

MBESC Statistics

30% more learners 50% more in north
1990 : 382445
1998 : 497418
Teachers
1990 : 13200
1998 : 17000
New classrooms
2727 since 1990
Budget
80% salaries
1.81% supplies
Infrastructure
39.4 % lack toilets
64.3% lack power

Ministry of Basic Education Realities

Article 20 of Constitution establishes right of all residents to education and compulsory education for all children
- 38% of 15-24 year age group unemployed
- 3% population growth rate
- Quality education is labour intensive

Message: **Priorities are new schools, more teachers, better infrastructure**

Ministry primarily regards Museum as a **cultural institution**

Message: **Primary user requires commitment to cultural heritage**

2010 predictions for national manpower situation
Serious shortage of professionals/technicians in engineering, sciences, technology, and artisan trades
Overproduction of environmentalists, agriculturalists, teachers

***Message*: Personnel situation are likely to get worse**

12

Services

Multi-disciplinary museum

Annual publication *Cimbebasia*

www.natmus.cul.na
>250000 annual visitors

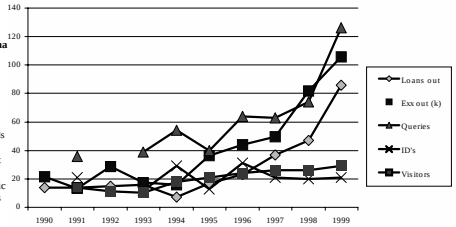
On-line databases

Internationally research standards

Training on request

Specialist diagnostic services / reports

In-service student training



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Influences

What can change state?

Proven demand

Investment - you pay, you get

Major GRN changes (MBESC, MoF, MWTC)

Donor support

Strategic partnerships

Programme development

Frame conditions
National commitment
Marginilization
Policy implementation
No legislation
Unrealistic expectations
Professional recognition

Infrastructure
Fleet reduction
Creeping obsolescence
Non-allocation of funds
Maintenance low priority
Local supplier support

Personnel
Chronically understaffed
- Recruiting qualified personnel
- Retaining qualified personnel

Appointment delays
Responsibility overload
Limited capacity for in-service training

Financial
Budgeting process
Fiscal administration
Budget implementation
Purchase delays
Inflation

13

User Profiles

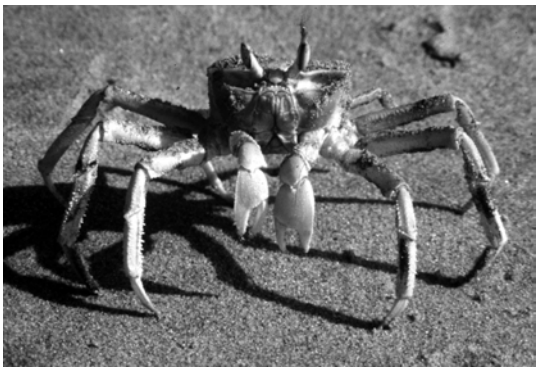
The Museum is?

a cultural institution
a tertiary training facility
a multi-disciplinary research centre
a diagnostic laboratory
a conservation facility
an information distributor
a tourist attraction
an open learning provider

Client group	Service required
General public	Helpful information
	Heritage preservation (in/tangible)
	Opportunities for income generation
	Place of leisure
GRN & NGO's	Low-cost operations
	Relevant information
	Reliable and efficient service
	Appropriate training
	Solutions to problems
International	Relevant Namibian information
	Access to physical heritage objects
	Project cooperation
Ourselves	Maintaining standards
	Heritage security
	Career development
	Ethical conduct

11

*****



Ocypode cursor, the ghost crab, one of the more than 350 crustaceans found in Namibia.

Summaries of discussions in breakaway groups

Users were asked to classify themselves into one of three stakeholder groups:
- Primary consumers
- Secondary or tertiary consumers
- Primary producers

These then formed three breakaway groups that came up with three separate needs lists at the end of day one. The lists were:

PRIMARY CONSUMERS

What we need	One-off / Regular	General / Restricted	Format
Wider taxonomic coverage (Fungi, Algae, Protists)	R	G	Institution & Internet Resources
Improve ID service (Speed, Quality)	R	G	
Translate reference material	O	G	
Update reference material	R	G	
Collate taxonomic "toolboxes"	R	G	
Awareness & political will • Articulated coherent vision for biosystematics • Collation of economic values of biodiversity and biosystematic info • "Vision delivery" & Awareness Campaign: top-down, bottom-up	 O(R) R R	 G G G	
More Red Data Lists !! Electronic vs. Published • "One stop shop" Web Portal for RDBs & Maps	R	G	Web (NBP + InfoCom)
More physical archiving / cabinet space!	R	R	
Field Guides & Keys (which ones?)	O/R update	G	
Taxonomic jurisdiction clarity!	O/R revisited	G	
Training of parataxonomists & technicians	R	G	
Taxonomic Register (national / global)	O/update	R	
Training of extension services (all)	R	G	
Curriculum development (NIED / NBP)	R	G	
Pre-requisites: • Government is serious about implementing the CBD • Ministers & Decision Makers who apply themselves professionally			

SECONDARY AND TERTIARY CONSUMERS

1. ATTRIBUTE DATA
   a. BASIC
   - Distribution in GIS format – abundance
   - Taxonomy / nomenclature (common / local names)

   b. APPLIED
   - Population dynamics / structure
   - Keystone species
   - Horticultural use
   - Behaviour

- Successional status
- Endemism
- Indicator species
- Co-existence
- Poisonous (Pathogenic)
- Habitat requirements
- Ecosystem (functional value)
- Red Data Lists
- Conservation status
- Legislation

c. SOCIO-CULTURAL

- Economic use (commercial, medicinal, traditional, etc.)
- Local names

2. SERVICES

- Improved ID services (time & quality)
- Access to physical material (seed, etc.)
- User friendly database with metadatabase framework
- Training (users & suppliers)

3. PRODUCT OUTPUTS

- General popular
  – pamphlets, newsletters & school material
- Semi-popular
  – field guides & updated RDL
- Scientific
  – checklists, species lists (updated)
  -- publications

4. COMMUNICATION

- Improved institutional linkages (including data sharing policy)
- Their needs from user
  – regulation
  – specimen requirements
  – undercollected material
- What's available now & planned
- Library
- Available information disseminated in a user friendly way to all stakeholders

PRIMARY PRODUCERS

Products needed:
Access to reliable literature
Regular subscription to journals and books
Access to reprints
Budget
Completed, updated English Flora of Namibia
Access to ancient literature
Checklist of Namibian plants with full synonymy
List of common names
Access to abstracting journals: e.g. Zoological Record, Kew Literature
Good taxonomic relational database, user-friendly
Accurately identified reference collection
Repatriation of material and information
Alignment of PRE and WIND databases
Digital imaging of species

Infrastructure needed:
New collection halls and cupboards
More working space
Graphic scanner – 3D specimen images

Scanning electron microscope (Access to)
Standard microscopes
Microtome
Access to DNA analysis
Digital callipers
Digital micrometric equipment

Human resources needed:
Lots of taxonomists
IT personnel / expertise – programmers
– data capturers
Clerical staff
Information and education officers
Internships and expert exchange
Technical staff
Field collectors
Librarians
Service continuity:
In-house training
Available trainers
Evaluation & supervision
Training resources
Overlap period when senior personnel leave
Advance planning / warning

Enabling environment needed
Policy when leaving service (Personnel)
Training policy and contract
Funding environment that allows essentials to be purchased

Mentors
Collaborative agreements with other institutions (twinships)
Scholarship programmes (screening procedures, internships, scholarship conditions)

*****

Editorial note: It is interesting to see the differences in needs here. Secondary and tertiary consumers mainly need products and information. Producers mainly need infrastructure, equipment and enabling environments. Primary consumers (being themselves secondary producers) need a mix of both the previous.

*****

Cauricara eburnea, an endemic Namibian beetle with a restricted distribution range, among pebbles covered with indigenous lichens.

Identified needs and priorities

Stakeholders were asked to identify areas of overlap between the three needs lists, and combine similar needs into higher categories. They came up with the list below. Delegates were then given the opportunity of prioritising each need on a scale from 1 (unimportant) to 5 (essential). At subsequent provider workshops, the practical implications of meeting these needs were explored in depth, and a similar prioritising exercise followed this re-assessment. As expected, user priorities were driven by their most urgent needs, while producer priorities were driven by the prerequisites for satisfying user needs, rather than the user needs themselves. Both these equally important viewpoints were eventually accommodated by using the average of the two (sometimes) opposing priority scores as a basis for further analysis.

User needs	Priority score (out of 5)		
	User	Producer	Average
Collation of priority information			
Collate 'taxonomic toolboxes'	3.92	3.09	3.50
Determine the economic value of biodiversity and biosystematic information	3.84	1.18	2.51
Collections			
Update reference material (i.e. do scientific curation of literature and specimens)	4.01	5.00	4.50
Provide more physical archiving space for primary producer institutions	3.70	4.09	3.90
Communication			
Launch an active information campaign detailing the value of biosystematic information	3.41	2.73	3.07
Communicate the needs of producers to users (e.g. regulations, permits, collecting methodology, undercollected areas and groups)	3.93	2.87	3.40
Publicise materials and services that are already available, or being planned	3.33	3.64	3.48
Information technology			
Develop user-friendly relational databases of biosystematic information	4.04	4.36	4.20
Make appropriate attribute data available	4.27	1.18	2.72
Produce a register of taxonomic expertise	3.22	1.09	2.15
Provide a 'one-stop shop' web portal for biosystematic information in Namibia	3.86	3.00	3.43
Provide information on distribution and abundance of species in GIS format	4.33	1.64	2.98
Products			
Produce Field guides and keys for Namibia	3.91	3.91	3.91
Produce general and popular publications (e.g. pamphlets, newsletters, school materials)	2.99	3.36	3.17
Produce lists of local and common names of species	3.75	2.64	3.19
Produce Red Data Lists	4.02	1.91	2.97
Produce scientific publications	2.87	4.64	3.75
Produce updated checklists of Namibian species	4.26	4.55	4.40
Produce updated comprehensive species lists for Namibia	3.56	3.64	3.60
Translate reference material into English	3.77	3.09	3.43
Research			
Do priority-driven taxonomic research	2.97	5.00	3.99
Research specific species attributes, e.g. endemism, habitat requirements, indicator species, etc.	4.08	2.18	3.13
Services			
Improve/maintain/increase existing identification services	3.83	4.82	4.33
Process, analyse and synthesise information (i.e. deliver interpreted data)	4.06	1.36	2.71

Provide biosystematic library services	3.02	4.00	3.51
Strategic planning / enabling environment			
Determine institutional mandates for coverage of taxonomical groups	3.24	1.09	2.17
Articulate a coherent vision for biosystematics in Namibia	3.49	1.72	2.61
Improve biosystematic institutional linkages	3.31	3.82	3.56
Establish policies to enable good-practice access to biodiversity data and material	3.40	4.18	3.79
Training			
Train biosystematics users (incl. extension services) in field techniques	4.15	1.73	2.94
Interact with tertiary institutions on the training of biosystematists	3.19	4.18	3.69
Train the producers themselves through internships, graduate and postgraduate study	3.37	4.91	4.14
Provide taxonomic training for technicians	3.80	5.00	4.40
Provide mentoring and in-service training for taxonomists	3.75	4.82	4.29
Train parataxonomists	3.84	1.45	2.65

*****

Lepus capensis, the Cape Hare, one of the smaller and less conspicuous of Namibia's 256 mammal species.

Results: The needs and priorities of Namibian Biosystematic Users

John Irish
Biosystematics Co-ordinator
with members of Biosystematics Working Group

Basic prerequisites
The same suite of prerequisites came up repeatedly, and came to be termed the 'Basic prerequisites'. They are: having the necessary **staff** to do a job, that those staff are adequately **trained** for the job, that they have **time** to do the job, that they have the necessary **infrastructure**, **equipment** or **money** to do the job, that they have access to the necessary taxonomical **literature** to do the job, and that there is **organisational support** for the job in hand.

User needs were arranged in sequence from highest to lowest overall priority. The brief needs statement is followed by an explanation of what the need entails and why it is important, and what the current situation is with regard to this need in Namibia. The responsibility for meeting this need is assigned to an appropriate group, and the user and producer priority scores are repeated. In the last column the prerequisites for meeting each need, if any, are enumerated along with any other comments on the ideal enabling environment. Pivotal prerequisites are marked in bold type. Where appropriate, editorial comments have been added in a separate line at the bottom.

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
1. Update reference material.	Do scientific curation of literature and specimens. Keep the names on specimens synchronised with the latest taxonomical work on the group concerned. Identify unidentified material.	Though recognised as highly important, this is receiving less attention than it should. Staff, infrastructure, funding and literature shortages make it difficult to achieve much progress.	Primary producers	4.01	5.00	**Basic prerequisites** apply. International collaboration is essential where there is no local expertise on a group. (Updated reference collections is itself a prerequisite for many other activities).
Curation is at the heart of collection maintenance, and collections are essential for the rendering of biosystematic services, hence it is appropriate that this should have emerged as the highest priority.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
2. Produce updated checklists of Na-	Lists of species occurring in Namibia, with the correct current	There is a recent published plant list available (Craven, 1999).	Primary producers	3.56	3.64	**Biosystematic databases** in place (need 6). Updated **refer-**

mibian species.	Latin name for each, and synonymic names where applicable. These are taxonomically based lists, in contrast with need 14, which calls for geographically based lists.	Published lists (sometimes dated) of a variety of animals are available, but widely scattered in the literature. Informal lists of many other taxa are available from different individuals. No readily accessible complete list exists.				**ence collections** (need 1) and sufficient taxonomical **literature resources** (need 16) required.
A 'one-stop shop' on the Internet (need 20) may be an effective way of distributing taxonomical checklists.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
3. Provide taxonomic training for technicians.	Technicians are the curatorial backbone of any biosystematic institution. Different disciplines require very different technical skills, so each technician needs to be trained individually for a specific job.	Primary producers train their own technicians, and accept that this is the only way to ensure that they acquire the necessary skills. Resource constraints prevent producers from training any but their own staff in this way.	Primary producers, but only for their own staff	3.80	5.00	Suitable **recruits** to be trained. **Staff** to train them. **Basic prerequisites** apply.
Need 1 emphasised the importance of collections. This need emphasises the importance of having trained people to maintain those collections.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
4. Improve, maintain and increase existing identification services.	The Herbarium and Museum are the primary institutions providing biological identification services in Namibia (cf. Questionnaire 2). The best service possible with available resources is already being provided, but providers themselves are not satisfied with this and wish to improve it. They particularly desire to speed up the process.	A large number (cf. Questionnaire 11) of identifications are provided for a wide variety of users. Most are done in-house by available staff, and tailored to the level of both staff expertise and user requirements. Where determinations cannot be done locally, material can be distributed to international specialists.	Primary producers	3.83	4.82	**Basic prerequisites** apply, with good access to **taxonomical literature** being specifically highlighted. **Training** of staff can be improved, as can client education. Updated **reference collections** (need 1) are essential. Access to a **SEM** (scanning electron microscope) would be ideal (none currently available in Namibia).

Initiatives to streamline the administration and lessen bureaucracy involved in the rendering of identification services would help, as would anything else that serves to lessen the non-taxonomical workload of taxonomists.

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
5. Provide mentoring and in-service training for taxonomists.	Because every taxonomic group is different, formal biosystematic training can take a budding taxonomist only so far. The details have to be learnt on the job. Experience has shown that the process is much more effective if it happens under the mentoring supervision of senior taxonomist(s) at the same institution, rather than in isolation.	While there are individuals who could possibly act as mentors in Namibia, they are too swamped by administrative duties to be able to function as such. Mentoring implies actual research activity in the field, as well as enough quality time available to spend with the trainee. This is impossible under current conditions.	Primary producers, at institutes	3.75	4.82	**Experienced mentors**, and salaries for them. **Time**. Trainees. In the case of in-service training for students, basic **salaries** or subsistence money.
Mentoring is a two-way process, in which both mentor and mentored benefit. It is essential to ensure continuity of skills and services in biosystematic organisations. For this reason distance mentoring, though currently practised out of necessity, is considered inappropriate as a long-term strategy.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
6. Develop user-friendly relational databases of biosystematic information.	This is the foundation upon which all other information development and information requests rests. There are two aspects to this. The first concerns taxonomical data (already treated under need 2), while the second concerns collection data. While there can be no access restrictions on taxonomical data, collection data may be of a sensitive nature and needs to be treated in ways that prevent, *e.g.* commercial exploitation.	*Taxon data*: Available for most actively curated groups. *Collection data*: Different collections range from fully to minimally databased. Existing databases are almost invariably non-relational. Varying platforms and formats hamper data exchange. Usability tends to be low.	Populating and maintaining databases are primary producer responsibilities. The long-term administration of databases is problematic unless providers can acquire dedicated in-house expertise.	4.04	4.36	**Basic prerequisites** apply, especially **staff** and training. Staff to include system administrators and data typists. A viable **access policy** (need 11) is essential. **Standardisation**, **compatibility** and ways to meet upgrade costs need to be addressed. (Biosystematic databases are themselves prerequisites for many other activities).

It is an overlooked fact that the most time-consuming phase of databasing is data verification, and that data cannot be reliably released before this has been completed. Given the potential volume of data involved, a prioritisation process will need to be followed. Sensible relational database design should be followed to prevent duplication of effort or data. Long term financial viability can best be met by use of Open Source Software.

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
7. Train the producers themselves through internships, graduate and postgraduate study.	Existing staff members that show potential should be encouraged to undergo appropriate further training that would allow them to better function as primary producers.	There are no policy impediments preventing this. Finding trainable people in the first place is considered a problem, though. Having them absent from work is a further problem, and then retaining them once they are trained is also difficult. It is problematic that no budget allocations can be made for students, while student transport (or lack of it) is a recurrent problem.	Individuals to initiate; primary producers to provide enabling environment and facilitate.	3.37	4.91	**Basic prerequisites** apply. **Bursaries** for students. Funding for **replacement staff** during off-site training. **Contractual obligations** on trained staff in order to retain them in the short term. **Better salaries** to prevent trainees from taking on more lucrative positions in the longer term.
A selection and screening process would be essential to ensure that only viable candidates are backed. The existence of projects for students with funds to support those projects is assumed.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
8. Do priority-driven taxonomic research.	Revise Namibian taxa, describe new species, re-describe existing species where appropriate, sort out synonymies and other nomenclatural issues, produce keys and publish the results.	Currently almost no taxonomic publications are being produced locally. Most Namibian taxa are described by foreigners, though usually in co-operation with Namibian institutions.	Primary producers	2.97	5.00	**Basic prerequisites** apply. **Biosystematic databases** and updated **reference collections** to be in place. Priorities need to be **defined**. **Expertise** needs to be available.
This is the backbone of systematics, and the prerequisite for satisfying need 12.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
9. Produce field guides and keys for Namibia.	These are generally glossy books with lots of pictures, aimed at the interested public, but with enough scientific backbone to be useful to professionals, too.	Limited variety already available, more in development or planning. Primary producers are highly enthusiastic about field guides, but the reality is that the production of field guides is normally too labour-intensive for them to undertake.	Primary producers must generate the necessary information, but not necessarily produce the field guides themselves.	3.91	3.91	**Determination of viable taxa** to treat, considering potential market size. **Basic prerequisites** apply to production of information.
Field guides are a powerful biodiversity marketing and awareness tool. Possible partnerships may be explored: primary producers to produce information, while secondary producers or dedicated amateurs collate this into field guides. Partnerships with printers may serve to keep costs low. The possibility of setting up a national trust fund to finance the publication of field guides is to be explored, too.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
10. Provide more and suitable physical archiving space for primary producer institutions.	Comprehensive reference collections are essential for the efficient rendering of biosystematic services. Such collections need space, and suitable conditions in that space. Calls to take responsibility for unmandated organisms (need 34), as well as for better services (need 4), imply more reference material, and hence more space.	*NBRI*: The relatively new building suffers from serious leakages that pose a regular threat to specimens. The Herbarium wing is filled to capacity. Though originally designed to be able to accommodate one more floor, functions have expanded so much since that even this is likely to be a temporary solution only. *NMN*: The museum is housed in an old school building, which is totally inadequate for the preservation of biological material. They are anyway also filled to capacity.	Central government, lobbied by all biosystematic users and providers.	3.70	4.09	**Buildings**. The museum critically needs a suitable, preferably custom-built, building in the short term. The Herbarium needs more space in the medium term. **Government commitment** is essential before this level of investment will realise.

It may be most cost-effective in the long term to think in terms of a suitably equipped building to house both museum and herbarium collections and their staff. A shared facility called *e.g.* the 'Biological Survey of Namibia' may be an answer.

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
11. Establish policies to enable good-practice access to biodiversity data and material.	Unrestricted access to the valuable or sensitive data under the custodianship of primary producers would be undesirable. There need to be policies in place that allow legitimate use of these resources, while preventing their inappropriate use (*e.g.* for commercial exploitation, personal gain, or biodiversity-threatening activities).	Clear ministerial data access policies exist for both primary producers. The main problem is that users don't like these policies, while some consider themselves exempt from policy provisions. Deficient as they may be, providers have no option but to comply with existing policy.	Primary producers, within the constraints of existing policy Biosystematics Co-ordinator, OPM-IT, Info-Com.	3.40	4.18	**Revised** consistent and equitable **data access policies** would be beneficial.
	The same applies to biological material in reference collections. Type specimens and genetic material are especially valuable, but vulnerable, classes of material.	Control of physical access to material may be as important, but is more neglected. A particularly vexing problem is material that is loaned and never returned, or types that are described but never deposited here.	Primary producers, Department of Justice, MET Permit Office.			Control of physical access is dependent upon suitable **infrastructure** being in place (refer need 9). **Consultation on permit requirements** (refer need 21), followed by **repatriation** of illegally retained types / material.
If both Namibian primary biosystematic producers, as well as their most active primary consumers, were located in one institution, it would be easier to implement a consistent policy than trying to synchronise currently disparate policies. Legal advice on the international enforceability of current permit requirements, material transfer agreements and loan agreements to be sought.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
12. Produce scientific publications in biosystematics.	Descriptions of new species, or revisions of higher taxa, published in peer-reviewed scientific journals.	Currently almost no taxonomic publications are being produced locally. Most Namibian taxa are described by foreigners, though usually in co-operation with	Primary producers	2.87	4.64	**Basic prerequisites** apply. **Time**. Ministerial support.

		Namibian institutions.				
This is the most basic activity of any biosystematic institution, but also the first to suffer when basic prerequisites are not met. It affects all other aspects of service provision, negatively. The current situation can be taken as a barometer of the system's health, and indicates an unsatisfactory situation with no long-term sustainability. When researchers spend inordinate amounts of time wrapped up in the red tape surrounding the purchase of simple consumables, something is wrong.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
13. Interact with tertiary institutions on the training of biosystematists.	Viable biosystematic services require tertiary-trained personnel (refer Questionnaire 3). Many tertiary institutions giving training in biology have no in-house biosystematics expertise, and their students are insufficiently trained in this area to be employed by primary producers. Some foreign-trained students may have the knowledge, but lack the local context to be effective in Namibia.	Namibia's two tertiary training institutions both have biological components, but limited or no biosystematic expertise. Providers regularly and productively interact with the Polytechnic and their students. In contrast, relationships with UNAM are strained or non-existent. Long running attempts to initiate a joint UNAM-Humboldt University M.Sc. course in Systematics keep on floundering. Recent offers by providers to lecture in biosystematics were rejected by UNAM.	*Training*: UNAM, Polytechnic, foreign universities. *Advisory role*: Primary producers, Ministry of Higher Education.	3.19	4.18	**Timeous serious consultation** on curricula and current practice. Getting the **Humboldt MSc course** off the ground. **Change in UNAM mindset** regarding graduate courses in biology. **Bursaries** for students.
Lack of training and trainees seriously threatens continuity and long-term survival of Namibian biosystematics. The ideal is still to produce sufficient competent local biosystematists at local tertiary institutions, but the reality of repeated failures have caused many to give up on this dream.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
14. Produce updated comprehensive species lists for Namibia.	In contrast to need 2, these are understood to be annotated lists of species that occur in defined areas of Namibia, *e.g.* individual conservancies or nature reserves. Such lists are valuable tools for biodiversity managers or EIA	Informal lists exist for some areas. Plant lists can be generated from the Herbarium database, and DSS can generate lists for some vertebrates, but both then require time-consuming verification before they are use-	Primary producers, once prerequisites are met.	4.26	4.55	**Biosystematic databases** (need 6) to be in place. Updated **reference collections** (need 1) and sufficient taxonomical **literature resources** (need 16).

	consultants.	ful. The Museum lacks such a facility in the case of key undatabased collections, and can only produce lists by labour-intensive literature searches and physical examination of collections.				
Thanks to SABONET participation, the Herbarium is able to produce checklists, albeit not without effort, while the Museum has no simple way of doing this. It is therefore interesting to note that the Herbarium considered meeting this need to be part of their day-to-day responsibilities, while the Museum did not. For the Museum this only becomes their responsibility when the issue concerned is one of national importance. Improving the Museum's database situation should remove this discrepancy; till then it remains a prime example of lack of infrastructure constraining service delivery.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
15. Improve biosystematic institutional linkages.	Inter-institutional communication, co-operation and information exchange with other primary producers, both inside Namibia, in the SADC region, and internationally, is essential for efficient biosystematic service provision. This includes attendance of congresses and workshops by staff members.	Linkages inside Namibia, and in the SADC region, are well established and initiatives are underway to strengthen and expand these. Internationally the Museum has as many existing co-operation agreements with other biosystematic institutions as it can handle. The Herbarium is not as strong in the latter regard.	Biosystematics Co-ordinator to facilitate, primary producers to implement	3.31	3.82	**Basic prerequisites** apply, otherwise what is there to link to? Funding for travel to other institutions and **attendance of congresses** is particularly important.
A well-linked institution can survive support failures that would kill unlinked institutions. By maintaining very many co-operative linkages and relying on each for just a little support now and then, it is possible to just get by. However, this is decidedly not a strategy that is viable in the long term. There eventually has to be reciprocation or the link expires.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
16. Provide biosystematic library services.	Access to taxonomical literature is essential for the practice of biosystematics. 'Literature' includes the original descriptions of all	Both primary producers have libraries, but neither is under their direct control. Biosystematic library support in Na-	Primary producers, within the constraints of National Library	3.02	4.00	**Funds** for books and journals. Dedicated library **staff**. Library **databases** and data links.

	Namibian taxa, general works on regional or global faunas and floras, and current journals (in order to keep up with developments in the field). A library service should include a 'curation of information' component: it is not enough to simply have literature, librarians should actively scan this and bring relevant articles to the attention of staff. The cost of international inter-library loans is prohibitive.	mibia is grossly inadequate. The Herbarium has survived through literature access provided by SABONET. The Museum survives by extensive exchange agreements for their in-house journal, *Cimbebasia*. These initiatives are aimed at satisfying the requirements of the institutions themselves. While other users are normally welcome to make use of these libraries, there are no initiatives to specifically cater for outside users.	policy, National Librarian's Forum			Library **security** is a major concern.
SABONET is coming to an end. The Herbarium produces occasional papers (including editing *Dinteria* for the Namibia Scientific Society), but has no in-house journal in place for possible exchange agreements. Their literature situation is likely to deteriorate sharply. Literature access has sometimes been incorporated in the budget lines of externally funded projects, but this is not sustainable. To be investigated: the possibility of digitally scanning all non-copyrighted literature pertaining to Namibian biosystematics, as well as all copyrighted material where it is possible to negotiate 'fair use' agreements with the copyright holders, and making these locally available via a web site (*e.g*. the one suggested by need 20).						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
17. Collate 'taxonomic toolboxes'.	Gather all of the information needed to identify a group, together in one place (digital format makes most sense). Make available to interested users. It is assumed that this tool will be used by knowledgeable users to do their own identifications.	There are no such toolboxes available. While producers welcome anything that could potentially lessen their workload, they are unsure as to exactly what users require in this regard.	Primary producers	3.92	3.09	A clearer **definition** of what a 'taxonomic toolbox' entails is needed. A one-off **pilot project**, followed by re-evaluation, may help to clarify this. The process should be **user-driven**, dependent upon provider assessment.
Toolboxes will be ongoing projects that can never be 'finished' as long as there is taxonomy left to be done. They will need to be updated frequently, therefore each toolbox will carry with it ongoing time and personnel implications. The size of the potential user group then becomes an important consideration: clearly it would be out of the question to invest resources in a toolbox that is relevant to a limited interest group only.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
18. Publicise materials and services that are already available, or being planned.	Users require this information.	Providers do not publicise their services. As one put it: "We don't need <u>more</u> business, we already have more than we can handle." (refer Questionnaire 11)	Primary producers	3.33	3.64	A full provider **staff** complement, to handle existing and any additional business generated by publicising it.
There is a real need to advertise and make information available outside the group of Namibian professional biologists and beyond the borders of Windhoek. A web site such as suggested by need 20 may help, provided it is kept updated, again a function of staff availability.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
19. Translate reference materials into English.	Taxonomic literature is published in all languages. This creates difficulties where Namibian taxa are described in foreign languages. Trained taxonomists tend to take this in their stride.	The Herbarium is translating parts of the '*Prodromus*' (Merxmüller, 1966+) from German into English, mainly for internal use. The Museum has no need or desire to do anything similar. Apart from '*Prodromus*', no other works needing translation were mentioned at the workshops.	Primary producers disagree on whether this is their responsibility (refer priority scores on right). On balance, it is probably not.	3.77	NBRI: 4.09 NMN: 1.66	**Dedicated translators** with biological knowledge. **Funds** to outsource translation and to re-publish translated works.
Since all current and future user products are or will be rendered in English anyway, and remaining non-English products are obsolete or of limited interest only, it is unclear what benefit the massive time investment of translation would have for the average user. *It may be easier to simply produce new works than rehash history*. <u>Information</u>: *Prodromus* is a complete Namibian flora. It was completed more than 30 years ago. Parts of it are quite dated. It consists of 175 parts, and comprises an estimated 3000 pages of small type. WIND has started the process of updating *Prodromus*.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
20. Provide a 'one-stop shop' web portal for biosystematic information in Namibia.	While users themselves are unclear as to the content and scope of such an enterprise, any initiative that may reduce pressure on providers, and empower users to	Does not exist. The National Museum has searchable web databases of its collections, but they fall far short of what is asked for.	Ideally this should be Namibia's GBIF Focal Point. Primary produc-	3.86	3.00	Presupposes the existence of **biosystematics databases** and attendant requirements, as well as the establishment of a Namibian **GBIF Focal Point**.

	extract the information they need themselves, merits support. Many of the other needs expressed here could be met by such an enterprise.		ers will need to be heavily involved, but it is not clear whether actual implementation is their responsibility.			There would be a real need for providers to receive statistics of user utilisation of such a facility, to be used in future planning and product development.
This would be the logical extension of need 6 (which would give producers structured access to their own data), by extending such access to a larger audience, but sensible data access policies (need 11) would be crucial to its success. Namibia does not (yet) have an official GBIF Focal Point.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
21. Communicate the needs of producers to users.	At least three aspects to this need were enumerated by users. The first is information pertaining to regulations and permits required for collecting biological material.	Information on permits, research visas etc. is readily available, *i.a.* on the National Museum's web site. However, the application process is unduly time-consuming and error-prone, and this can result in dedicated foreign systematists taking their expertise elsewhere. A streamlined process would result in more research being done (need 8).	MET, Ministry of Home Affairs	3.93	2.09	Provider responsibility should be limited to **consultation on permit requirements**. There is a real need for more **communication** with and **feedback** from MET, especially where permit renewals are given based on claims of material deposited in-country that never reaches the institutions. **Streamlining permit process**.
	The second was information on collecting methodology and the standards to which collected material needs to conform.	Information on methodology and standards is not readily available, although a local work is in preparation (M. Griffin, pers. comm.)	Primary producers	3.93	3.83	The mentioned work should be adequate once available. Wide **dissemination**, possibly on a web site, would be beneficial.

	The third aspect relates to information on over- or undercollected areas and groups.	The information is available from providers, but not disseminated because of unfavourable effort/gain ratio. Undercollected areas tend to stay so, simply because they are usually not sexy places to go to. Undercollected groups are those that are unattractive and difficult to collect and curate. If providers themselves do not start work on unpopular areas and groups, little happens.	Primary producers	3.93	3.64	There is scope for collaboration with users on training and equipment for undercollected areas and groups. This information may also beneficially be put on a web site.
Since this is mostly static information that will require little maintenance once collated, the Internet is an obvious vessel for dissemination. There is real concern that unstructured collecting by non-taxonomists could lead to large amounts of low value material clogging the already strained identification services.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
22. Produce lists of local and common names of species.	The implication is that the common name of each species in each Namibian language and each of their local dialects, where applicable, be recorded. Such a list may have use in popularising biosystematics, and in connecting to indigenous knowledge.	This is another job that has become primary producer responsibility by default, even though they are ill equipped to handle it. Taxonomists are not linguists, and providers do not have the staff to give the regional coverage needed for this. A botanical list in preparation has highlighted these shortcomings.	*Documenting names*: Ethnobiologists, UNAM Linguistics Department. *Identifying voucher specimens*: primary producers.	3.75	2.64	**Ethno-biological nomenclatural initiatives** with input by primary producers.
In all languages, common names at species level exist for a limited subset of higher plants and animals only; the bulk of taxa have at most general group names at higher levels. There is some irony in directing this request at biosystematists. Biosystematics and the binomial Linnaean system are specifically intended to overcome the confusion inherent in common names.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
23. Produce general and popular publications (e.g. pamphlets, newsletters, school materials).	It is assumed that these publications should deal with the results of biosystematics.	Information is potentially available, but providers lack resources (primarily time) to address the need. Should resources become available, popular articles would be possible. However, the writing of good school material requires specialised skills and would be best left to professionals in Education.	*Provision of information*: primary producers. *Preparation of product*: scientific writers, educators. (Biosystematics Co-ordinator may facilitate).	2.99	3.36	Basic prerequisites apply. Collaboration with competent **scientific writers** and **educators**.
Yet another example of biosystematists being expected to provide services derived from biosystematics, but completely outside their sphere of expertise.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
24. Research specific species attributes, *e.g.* endemism, habitat requirements, indicator species, etc.	For a list of attributes, refer to summary of Secondary and Tertiary Consumer discussions on pages 23-24. The request is that primary producers will do the basic research that will determine these attributes for individual species.	Attribute data may be a result of taxonomy, but it is not the primary reason for doing taxonomy. Primary producers find that their limited resources are stretched to the limit merely fulfilling their core functions, and they cannot take on additional research peripheral to biosystematics. They acknowledge that such research is important and support it being undertaken by appropriate discipline researchers.	Ecologists?	4.08	2.18	**Biosystematic databases** will provide a framework into which existing and new attribute data can be tied. Attribute data may also become available as incidental results of **updating reference collections**, or **doing taxonomic research**.
Biosystematic databases (need 6) can provide a framework into which attribute data may be fitted. A web portal (need 20) may provide a vessel for disseminating the information.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
25. Launch an active information campaign detailing the value of biosystematic information.	This is the actual dissemination of the information that is to be gathered in terms of need 33 below.	Primary producers already do this on an opportunistic *ad hoc* basis. Due to limited resources, they are unable to play a more active part in disseminating the information. Their skills are not in the public relations sphere.	Secondary producers; BDTF	3.41	2.73	Identify the target audience. MET to appoint a **Biodiversity Information Officer**.
While unable to do this themselves or a large scale or regular basis, primary producers acknowledge the importance of positive publicity and will co-operate with any dedicated and sustainable public relations exercises.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
26. Provide information on distribution and abundance of species in GIS format.	It is unclear what is meant by 'GIS format', since there is no single such format. Structured distribution data should be usable in most standard GIS applications.	Not readily available. Improvement of primary producers' database situation (need 6) will make the extraction of distribution data simpler than at present.	*Distribution data*: primary producers. *GIS format*: user's own responsibility.	4.33	1.64	This is an implicit offshoot of the existence of **biosystematic databases** (need 6). Sensitive distribution data (*e.g.* Red Data species) will need to be covered by a **data access policy** (need 11).
There is provider concern over the high potential for misinterpretation of distribution information. Examples were given where the link between data and data context was broken and deficient data was used to 'prove' erroneous assumptions.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
27. Produce Red Data Lists.	Red Data Lists enumerate taxa that are of high conservation concern, rated according to criteria developed by IUCN. Though systematics underpins this, it is not primarily a biosystematic activity.	Lists exist for Namibian plants and vertebrates only.	*Provide information*: primary producers. *Produce lists*: MET, ecologists.	4.02	1.91	Provider ability to provide information will be greatly enhanced by the existence of **biosystematic databases** (need 6), as well as comprehensive **voucher collections** (need 1).

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
28. Train biosystematics users (Extension services specified) in field techniques.	Field techniques relevant to this discussion are collecting and preserving methods. The implication is that users would then use their training to collect material that is useful to providers.	There are no formal or regular training initiatives, but individuals entering into collaboration with providers are thoroughly briefed. Primary producers are willing to provide formal training on a needs-driven basis, but requests for this should be user-initiated.	Primary producers in collaboration with user groups, training institutions or NGO's.	4.15	1.73	To take place in response to **defined priority needs** only. **Logistical arrangements** by users to be in place, i.e.: all costs to be for users' account, producers to supply training only.
The high priority accorded this need by users point to the lack of relevant modules in formal qualifications on the one hand, and the high need for such training on the other hand. The low priority accorded this need by producers indicates that the request is being addressed to institutions not primarily in the business of training. That they are willing to undertake it anyway is to their credit but once again compromises their ability to deliver core services. A manual of techniques that is in development (M. Griffin pers. comm.) may help alleviate this need.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
29. Make appropriate attribute data available (*i.e.* non-taxonomic data that is associated with specimens).	This is the dissemination of the data emanating from satisfying need 24.	Collection label data is implicitly available in existing and planned databases. There are no specific plans to cater for other attribute data, but it would be simple to incorporate or link to any attribute data collated by other agencies.	*Collection label data and biosystematic framework data*: primary producers. *Anything else*: Secondary producers, others?	4.27	1.18	Suggested **biosystematics databases** and their **access policies** to be in place.
Once again, biosystematic databases (need 6) can provide the framework on which non-systematic information can be hung.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
30. Process, analyse and synthesise information (*i.e.* deliver interpreted	Take primary biosystematic data and transform it into specific (presumably user-requested) syntheses. This activity assumes a high	Primary producers do not have the resources to address this need. They do render the service in cases where provision of the	Unclear. There is a cut-off point beyond which providing	4.06	1.36	**Basic prerequisites** apply. Better **definition** of need, scope of involvement and cut-off points necessary. Possible

data).	level of training, Namibian experience, and background knowledge in the person doing it, and is likely to be very time-intensive.	information is in the national interest, but then at the cost of interrupting their normal line functions.	information (as opposed to data) becomes doing someone else's research for them.			policy decisions.
Primary producers face a dilemma. On the one hand they are best qualified to interpret biosystematic data and wish to do so and avoid the kind of problems mentioned under need 26. On the other hand they simply do not have the resources to do so in all cases. One solution may be to lessen the impact of this activity by deferring to supervised interpretation (student projects, or outsourcing). The latter carries its own assumptions and prerequisites.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
31. Train parataxonomists.	Parataxonomists are to taxonomists what paramedics are to medical doctors. They need to be trained, and may reduce the workload of specialist taxonomists by assuming less specialised biosystematic duties. The concept was initiated and has most famously succeeded at the INBio facility in Costa Rica.	The potential worth of parataxonomy has been eroded by its bandwagon status and unjustified claims that it is a panacea for all biosystematic ills. It is not as simple as it seems and it may not necessarily be feasible in Namibia, but it is very definitely an option worth investigating.	Biosystematics Co-ordinator.	3.84	1.45	An in depth **feasibility study** for Namibia is needed, followed by **definition** of the envisaged application of parataxonomy in Namibia.
The potential role and function of parataxonomists in Namibia is not clear. The question was rightly asked: "Why?" If we have parataxonomists, what are we going to do with them? Also: is 'parataxonomist' not just a buzzword for biosystematics technician (need 3)?						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
32. Articulate a coherent vision for biosystematics in Namibia.	This may include visions of the 'mission statement' kind for popular consumption at the low end, and detailed strategy and action plans at the high end.	This is happening, and the User Workshop and this document are contributing towards it.	Biosystematics Co-ordinator, with primary producers	3.49	1.72	Continuation of the **Biosystematics Co-ordination** project.
The Biosystematics Co-ordination project should remain adaptive and dynamically responsive to new challenges as they emerge.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
33. Determine the economic value of biodiversity and biosystematic information.	By showing that biodiversity and biosystematic information can be translated into monetary value, it is hoped that these issues can become economically rather than ecologically motivated. Biosystematic funding may then be seen as a high-return investment and not as a bottomless pit.	Nothing is being done specifically in Namibia. However, organisations such as BioNET International and the GTI are active globally. Local providers believe this has had no effect on their situation, and question whether re-doing this in Namibia will benefit them. They believe their limited resources should rather be kept focused on their core functions, and that, anyway, this is a job for an economist, not a taxonomist.	Not a taxonomical issue. Suggest MET do this by localisation of global efforts.	3.84	1.18	DEA to appoint a dedicated **Natural Resource Economist**.
Opposing viewpoint: Many people believe that biodiversity is a moral issue that is diluted rather than strengthened by painting it in monetary colours. They point to many moral-based issues in civil society that are accepted and supported without ever needing justification in commercial terms.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
34. Determine institutional mandates for coverage of taxonomical groups.	A small number of higher taxa have no institutional 'homes' in Namibia. This is particularly true for micro-organisms. There is concern that progress in the knowledge, study and management of important organisms is effectively impossible until these organisms get allocated to specific institutions.	The Herbarium assumes broad biosystematic responsibility for all plants, and the Museum for all animals. They maintain collections on most major groups of both, while actively working on smaller subsets only. In principle, they are not averse to taking on more taxa, but limited resources currently prohibit any major coverage expansion.	Primary producers. Institutions themselves to determine their mandates.	3.24	1.09	**Basic prerequisites** apply. **Buildings**, staff, equipment and funding to handle additional responsibilities. **Policy decisions** in some cases. Possible **regional contractual agreements** in cases where there is a clear need that cannot be met locally.
This would become a non-issue if Namibian biosystematics service providers are consolidated under one umbrella.						

Need	Description	Current Situation	Responsibility	Priority score out of 5		Prerequisites / Enabling Environment
				Users	Providers	
35. Produce a register of taxonomic expertise.	It is unclear what was intended here: in-country expertise in Namibia, or worldwide expertise on taxa occurring in Namibia? And what would the purpose of such a list be? A purely Namibian list would be rather short, while a worldwide list would be a major undertaking.	Botanical information exists (SABONET). Providers are well aware of relevant contacts (cf. need 15), and willing to share this information with users on a need-to-know basis.	Possibly primary producers, but depends on definition of list; Biosystematics Co-ordinator to investigate.	3.22	1.09	Users to **define** scope and purpose of such a register, after which this need can be re-assessed.
There is real concern that an international register can be misused to bypass local service providers and deprive Namibia of *e.g.* voucher material or types, *as is, unfortunately, already happening*.						

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Chamaeleo namaquensis, the Namaqua Chameleon, one of Namibia's 273 reptile species.

Summary

John Irish
Biosystematics Co-ordinator

If pivotal prerequisites from the preceding results are listed along with the priority of each need for which it is a prerequisite, the following hierarchy of prerequisites emerges. (Basic prerequisites were broken into their component parts, and combined with solo mentions of these parts, while some related prerequisites were merged). Percentages relate to the percentage of *only these top ten prerequisites* that are represented by each.

Score	%	Prerequisite
110.97	21.89%	**Staff**, including all staff-related issues such as availability of time or expertise
92.19	18.18%	**Infrastructure**, including buildings and equipment
73.76	14.55%	**Information technology**, including databases, access policy and web presence
72.59	14.32%	**Training**, trainees and training enabling issues
53.3	10.51%	**Literature** resources
37.46	7.39%	Organisational support for biosystematics
26.92	5.31%	Biosystematic reference collections
17.86	3.52%	Various issues needing clarification / definition
11.11	2.19%	Biosystematic research
10.88	2.15%	Consultation by other agencies with primary providers

Not surprising, human resources (staff and training, which go hand in hand) emerge as the major prerequisite for effective biosystematic service in Namibia. Insufficient numbers of staff exert a direct influence on an institution's ability to render services. Insufficiently trained staff diminish the range of possible services an institution could render, besides overworking or inappropriately applying better trained staff, again to the detriment of service rendition. Insufficient infrastructure (paucity of labour-saving devices, recurrent downtime, obsolete equipment, researchers turned maintenance staff) merely exacerbates the effect of insufficient staff. Unfortunately staff, infrastructure and training are all issues for which there are no quick fixes or cheap solutions.

The high priority accorded to Information Technology is seen as a sign that local biosystematic providers are eager to present their information more effectively and to a wider audience. In contrast to the previous issues, investment in IT is likely to result in speedy service improvements in the short term (1-3 years), as providers themselves get a handle on their data. It can be a relatively quick fix, and it is relatively cheap: a sophisticated institutional IT system may cost less than the training of a single biosystematist. Literature is simply another form of biosystematic information, and it may be addressed in tandem with Information Technology.

It is interesting that the fundamentals of biosystematics (including institutional support, maintenance of collections and biosystematic research) ended up as slightly lower priorities. This supports the view that Namibian biosystematics is built on a solid foundation. At this time there is a greater need for information dissemination than generation of new information. There is greater need for infrastructure to preserve and interpret existing collections than to initiate new collections. There is a great need for people, but when they are found the institutional support they require will be there. ***Namibia's 'taxonomic impediment' is not lack of data, but lack of dissemination of data, caused by constraints on data dissemination structures.***

THE GOVERNMENT AND PEOPLE OF THE REPUBLIC OF NAMIBIA CAN BE PROUD OF THE FACT THAT WE HAVE REPUTABLE BIOSYSTEMATIC INSTITUTIONS, IN CONTRAST TO THE SAD DECLINE IN BIOSYSTEMATIC SERVICES IN MANY OTHER COUNTRIES. HOWEVER, ALL IS NOT WELL, AND THIS WORKSHOP HAS HIGHLIGHTED SOME OF THE CONSTRAINTS FACING THE MUSEUM AND HERBARIUM. NOW IS THE TIME TO GIVE THEM THE ADDITIONAL SUPPORT THEY NEED. THEY ARE ALREADY CREDITS TO OUR NATION. WITH SUPPORT, THEY CAN EASILY REACH EVEN HIGHER LEVELS OF EXCELLENCE REGIONALLY AND INTERNATIONALLY.

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Questionnaire results

John Irish
Biosystematics Co-ordinator

Following a suggestion at a think tank meeting, questionnaires were devised and given to delegates prior to commencement of the workshop. Questions were designed to gauge user perceptions on biosystematic matters, and presented users with a limited number of possible answers from which they could choose. The same questionnaire was given to providers at the meetings six months later.

Sample size: 26 questionnaires were completed at the User Workshop, and two more were solicited from non-attendees shortly afterwards. A further 11 questionnaires were completed at Provider meetings. Percentages often do not add up to 100%, because many respondents chose more than one option.

1. What do you think of the current quality of biosystematic end-user products in Namibia?	**Users %**	**Providers %**
Excellent!	0	0
Very useful	11	30
Acceptable	54	50
Pathetic	0	10
Products? What products?	39	0
Respondent comments: a) Products are not quite acceptable. b) Those products that do exist are very useful (NBRI, MET specified).		

Intended as an easy icebreaker question, but also to gauge user opinion and knowledge of existing products.
While the bulk of respondents were relatively happy with existing products, a disturbingly large proportion of users were unaware of the existence of any products. Since no Providers had the same problem, this points to a deficiency in the marketing of existing products. The only respondent who thought existing products were 'Pathetic' was, interestingly enough, a Provider, and may indicate the high standards Providers set for themselves.

2. Which is the best source of biosystematic information in and on Namibia?	**Users %**	**Providers %**
National Museum / Herbarium	93	91
University / Polytechnic	0	0
National Library	4	0
Independent consultants	7	9
The Internet	0	0
Respondent comments: In one case Museum/Herbarium was chosen, with 'Museum' crossed out.		

Intended to gauge the relative local standing of service providers.
The overwhelming majority of respondents confirmed the National Museum and Herbarium's standing as primary biosystematic service providers. The zero score for tertiary training institutions underscores the lack of local biosystematic training expertise. The zero score for Internet points to an under-utilised resource.

3. What is the minimum qualification you would expect someone making expert identifications to have?	**Users %**	**Providers %**
Matric, plus experience	14	9
Diploma	43	45
Degree	43	45
Doctorate	0	0

Doctorate, plus specialist training	4	9
Respondent comments: A large percentage of respondents noted the importance of both experience and specialist training, irrespective of the level of formal training.		

Intended to determine what skill value users placed on biosystematic expertise.
The majority of respondents recognised that some form of tertiary qualification is necessary. Users and Providers are in close agreement on this question.

4. If you need a definitive identification for a plant because it has possible commercial uses, where would you take it?	**Users %**	**Providers %**
I'll do it myself from a book	7	0
Directorate of Forestry	0	0
National Herbarium, Windhoek	96	100
Kirstenbosch, Cape Town	4	0
Kew Gardens, London	0	0
Respondent comments: None.		

Intended to gauge the National Herbarium's standing as a botanical biosystematic provider. See also question 9.
The overwhelming majority of respondents confirmed the Herbarium's standing, and that botanical expertise is available in country, or at least in the SADC region. Nobody thought it necessary to go overseas. The zero score for Forestry is expected because they are not in the business of biosystematics.

5. What do you think is the average replacement cost of a single biosystematic voucher specimen in a Namibian museum or herbarium?	**Users %**	**Providers %**
50c	0	0
N$ 5	4	0
N$ 20	11	9
N$ 50	32	18
More!	61	73
Respondent comments: One choice of 'More' was qualified with 'maybe'.		

Intended to determine whether users were aware of the high cost of initial collecting and processing, and the continuously high cost of curation and maintenance of collections.
Most respondents recognised that replacement costs were very high ('More' is probably the most accurate answer here). As expected, providers were nearer the mark than users. Clearly a few users (and providers!) need to be educated in this regard.

6. Do Namibian primary providers supply biosystematic information …?	**Users %**	**Providers %**
Not at all	0	0
Only under duress	32	9
Efficiently	14	27
Readily	57	55
Readily, and then surpass expectations	7	9
Respondent comments: a) Readily, but not readily enough. b) Readily, but take their time. c) NBRI: Efficiently, NMN: Only under duress.		

Intended to determine user perception of service quality.
Most respondents thought information was readily given. A high proportion of users thought that information was only given under duress. It may point to user impatience / ignorance of provider constraints, rather than any deliberate actions by providers. This is confirmed by the fact that nobody thought information was ever not provided. The, albeit low, score for 'surpass expectations' is a heartening sign that occasional successes are possible despite circumstances.

7. How long do you believe it takes on average for a Namibian specialist to determine the name of a single specimen?	**Users %**	**Providers %**
5 minutes	14	18
30 minutes	43	73
2 hours	18	18
1 day	7	0
1 week	21	0
Respondent comments: Many respondents pointed out that the answer to this is very much dependent upon the specimen, its condition, the data provided, and where it comes from. Some specified different times for different taxa. One added a category 'months'.		

Intended to determine users' understanding of what identification entails.
Given the fact that there is no 'correct' answer to this question, most respondents agreed on an average of 30 minutes, which is probably realistic. Of interest are the longer time estimates by some users (and the 'months' comment). This probably reflects provider workload / staff limitations: the ID may only take 30 minutes, but it might take the systematist weeks or months to get round to it.

8. What would you be willing to pay for a single expert identification if you really need it?	**Users %**	**Providers %**
Nothing, never!	4	0
N$ 10	36	27
N$ 80 (PPRI tariff)	29	36
N$ 350 (British Mus. Tariff)	4	0
Donation in kind	32	36
Respondent comments: a) Depends on usage. b) N$ 80, if supplied within 1 week. c) N$ 10, although taxes should subsidise. d) Only if determination is absolutely essential.		

Intended to provoke thought, and also to gauge user perception of the value of the services they currently get for free.
The low number of respondents who were not prepared to pay at all shows that users generally do value the services. However, the majority of users were only prepared to pay N$ 10 for what they previously agreed was 30 minutes work by a person with tertiary qualifications (i.e. they expect biosystematists to operate at a salary of N$38400 per annum). If one adds the high cost of curation (question 5), N$ 80 is probably nearer the mark. Of interest is the high proportion of both users and providers who were willing to give or accept donations in kind. Clearly there is much scope for non-monetary bilateral support and this needs to be followed up.

9. If you need to have an expert identification for an animal, because it is of possible medical importance, where would you take it?	**Users %**	**Providers %**
Ministry of Environment and Tourism	36	18
University of Namibia	0	0
National Museum, Windhoek	61	91
S.A. Museum, Cape Town	7	0
British Museum, London	11	0
Respondent comments: Several respondents pointed out that their answers to this question would be very much dependent upon what kind of animal is involved.		

Intended to gauge the National Museum's standing as a biosystematics service provider, as a companion to question 4.
While the majority of respondents chose the National Museum, not all did; probably because 'animal' was not defined, and because for some animals other institutions would be more appropriate. The rela-

tively high score for MET points to the vertebrate expertise in DSS. The zero score for UNAM is once again indicative of their lack of biosystematic expertise (see also question 2).

10. Who should fund biosystematics in Namibia?	**Users** **%**	**Providers** **%**
Ministry of Finance	54	30
Donor countries	21	20
Global Environmental Facility	25	10
Local NGO funders	25	20
Local users of the information	46	80
Respondent comments: The majority of respondents chose more than one option here, and some even chose all.		

Intended to gauge user perceptions of funding opportunities.
The bulk of respondents chose in-country funding sources, indicating a desire for permanent and sustainable biosystematics funding. Most users thought the Ministry of Finance should continue funding providers, as it does now, but they were also prepared to contribute themselves. Providers, with first-hand experience of MoF funding, rated this rather lower and instead pinned their hopes on user contributions. Given the user response to question 8, such contributions alone would probably not be sufficient to fund biosystematics provision in Namibia. A combination of funding sources may be most appropriate.

11. How often do you approach Namibian biosystematic service providers for information or identification?	**Users** **%**	**Providers** **%**
Never	11	9
Did it once, long ago	25	18
Monthly	39	18
Weekly	7	9
Daily	18	45
Respondent comments: a) A few times yearly. b) Annual. (The first was considered to be 'Monthly', and the second to be 'Once').		

Intended to determine the client volume of providers. Can also be used to rate responses: clearly a frequent users' opinion should carry more weight than a non-users'.
Most respondents make use of service providers on a monthly or even more regular basis. It seems the Museum and Herbarium do fulfil a need, and this confirms the results of question 6. Given the user sample size, these results imply an average of about 120 information requests per month, or, three per working day per institution. Bearing in mind that not all workshop delegates submitted questionnaires, and that not all biosystematic users attended the workshop, the true figure is probably much higher. Given staff shortages and other commitments, this may go some way towards explaining some answers to question 7.

12. Do you know what local biosystematics service providers' requirements for specimens or data are?	**Users** **%**	**Providers** **%**
Yes, of course!	32	64
Yes, unless it has changed again	25	9
No	11	9
Maybe, I'm not sure	32	18
Do they know?	0	0
Respondent comments: None.		

Intended to gauge user knowledge of provider requirements.
Most users think they know to a greater or lesser extent what provider requirements are, and the percentages that admit to not knowing correspond exactly to those who never make use of biosystematic services anyway (question 11). This contrasts somewhat with provider perceptions, which would have the majority of users ignorant of or insensitive to provider requirements. Clearly there is a case to be

made for more user education, and even provider education (witness one provider not knowing what their own requirements are).

Additional comments

Respondents were given the opportunity to add any other comments they wished to make. Some are reproduced below, with an indication of the user's regularity of use.

An annual user:

- If such service infrastructure is well established our facility will most certainly be a regular user.

Different monthly users:

- Information access policy is erratic between service-providing institutions.
- Museum needs to be sorted out + strengthened if anything is to change.
- Biosystematics is by nature too inefficient to deal with the urgency of the biodiversity crisis.
- Many of the questions above don't really apply to me, since I do my own identifications and know where to search for biosystematic information.
- It is sometimes difficult to get hold of specialists when they are out on trips.
- The expertise available in some organisations such as Forestry and Monuments Council is worrying. (Editor's comment: what does this have to do with biosystematics?)
- Some of the tick boxes are too different.

A user who only made use of services 'once, long ago':

- The NBRI is in a league of its own in Namibia - this is intended as a positive statement for the NBRI but a poor reflection on other institutions. (Editor's comment: On what does a non-user of services base such an assessment?)

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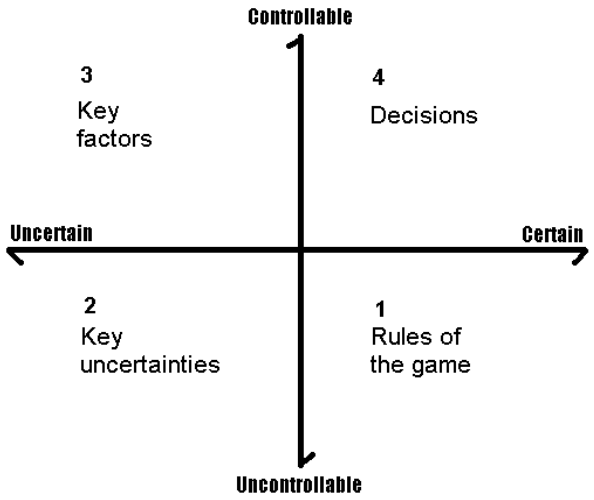
Opisthophthalmus litoralis, an endemic scorpion and one of Namibia's at least 1143 Arachnida species.

Conclusion

John Irish
Biosystematics Co-ordinator

The scenario planning methods of Illbury & Sunter (2001) teach that the key facts in a given situation can be fitted into a matrix where the one axis represents a scale from complete uncertainty to complete certainty. The other axis represents a scale ranging from matters completely under the control of those affected thereby, to a complete absence of control on the other hand. By considering each of the quadrants in turn, informed decisions may be made, in this case, on the future of biosystematics in Namibia.



1. Rules of the Game. Certain, but Uncontrollable
These are the parameters within which biosystematics in Namibia has to function, and over which biosystematists have little, or no, control.

- Government financial support is essential for biosystematics providers. The type of long term staff, infrastructure and maintenance investment required by biosystematic collections can only be viably provided by government. There is no permanency or continuity in donor funding. Our market is too small for privatisation to work.
- Government financial support is unlikely ever to be sufficient, because, unless there is a major change in mindset, government will never consider biosystematics a high priority. The least one should aim for is the provision of basic infrastructure, salary and running costs for institutions.
- Co-operative projects in Namibia with other biosystematic providers world-wide may be the way to get some actual biosystematic work done. By spreading the load thin and applying creative financial management, ends can be made to meet.
- The greatest need for biosystematic work will always be in those taxa most difficult to study and least likely to receive funding.
- The Taxonomical Impediment will not be solved soon unless taxonomy is revolutionised. This does not imply doing away with traditional taxonomy, only streamlining methods and liberating information.
- Much Namibian biosystematic information is potentially available, but inaccessible in practice.

2. Key Uncertainties. Both Uncertain and Uncontrollable
These are the factors that are unknown or unknowable, but depending on how they turn out, may have a pivotal effect on the development of biosystematics in Namibia.

- Primary biosystematics services in Namibia are split between two ministries (MAWRD and MBESC), and neither fits comfortably in its parent ministry. Limited secondary biosystematic services are provided by DSS (MET). Service fragmentation and duplication is inefficient. Consolidation of biosystematic services may remove many constraints and alleviate others. The concept of a combined 'Biological Survey of Namibia' has been seriously discussed before. If it becomes reality, it will have a profoundly positive effect on biosystematics in this country, but there

are no guarantees that the process will ever be started. Neither provider institution is in a position to initiate such a process, so there is effective absence of control from their viewpoint.

- Will taxonomy be revolutionised? Hopefully, yes. Will Namibia play any significant role in this? Probably not. Will we benefit if it does happen? Definitely, yes. Can we do anything to hasten the process? Probably little.
- Staff and infrastructure problems cannot be solved internally by biosystematic institutions. They can only petition government and advise training institutions, but have little control over the (uncertain) outcome. Yet, both are critically important for the survival of biosystematics in Namibia.

Resultant scenarios

Combining the above information against the background of the rest of these proceedings, we can postulate at least three possible scenarios for the future.

Scenario 1: Slow Decay. Basically a continuation of the *status quo*. Institutional support continues to be insufficient. Providers are kept ticking over, but creeping obsolescence eventually exacts its toll and provider institutions become incapable of rendering services. Staff leave and are not replaced. Providers become irrelevant. Biological collections become stagnant and decay. Namibian government makes decisions and implements policies without the benefit of sound, locally produced and up to date biosystematic information. Sustainable development becomes difficult or impossible. Resultant negative ecological, economical and social consequences for the country.

Scenario 2: Crash and Burn. Biosystematic providers, either collectively or individually, are transformed into entities that need to be profitable in order to survive (privitisation, para-statals, agencies). The small market in Namibia forces them to charge exhorbitant prices, and demand for their core services fall. They are forced to expand into more or less lucrative peripheral markets, and may even prosper there. However, shifting their focus from their core business reintroduces the slow neglect of biosystematics and reference collections, with the identical end result to Scenario 1.

Scenario 3: Bright New Dawn. Biosystematic providers get the institutional support, funding, infrastructure, staff and training they require to function effectively. They realise their potential and become a pride for Namibia and an example to the world. Biodiversity development in Namibia gets the biosystematic foundation it needs to be successful. Economically and ecologically sustainable development takes place, to the present and future advantage of all Namibians.

3. Key factors. Uncertain, but Controllable

While Scenario 1, Slow Decay, seems to be where we are currently heading unless there is some intervention, and Scenario 2, Crash and Burn, is an undesirable possibility, clearly scenario 3, Bright New Dawn, would be the preferred future. Which are the key factors that will more likely enable it than the others?

Factor 1: **Institutional structure**. Currently biosystematic and associated services in Namibia are fragmented among at least three Ministries. The placement of both primary biosystematics providers is untenable in the long run. Consolidating biosystematic services will strengthen their capacity to render service and give them collective bargaining power, while preventing duplication of effort, funding and infrastructure.

Factor 2: **Human resources**. Strong institutions need capable staff. The training of biosystematists in and for Namibia is essential to provide stability and continuity to biosystematic institutions.

Factor 3: **Collections infrastructure**. Biosystematics needs healthy, representative reference collections of biological material to function. Collections need good infrastructure, and intensive care and maintenance to function effectively.

Factor 4: **Accessible information**. The only viable way to keep track of and make sense of the overwhelming amount of biosystematic information potentially available, is through digital databasing. This should be a central component of any modern biosystematic institution.

Factor 5: Access to comprehensive **taxonomical literature**. Biosystematics is impossible without access to technical publications. These need to be available in-country for the greatest possible effectiveness.

4. Decisions. Certainly Controllable

In order to steer Namibian biosystematics towards a Bright New Dawn, and away from Slow Decay or Crash and Burn, we need to take decisions that will lead to enablement of the key factors listed above.

Decision 1: Initiate dialogue with at least OPM, MET, MAWRD and MBESC on possible consolidation of biosystematic services in what may provisionally be called the 'Biological Survey of Namibia'.

Decision 2: Establish appropriate training programs for Namibian biosystematists.

Decision 3: Establish minimum standards for collection infrastructure and secure government commitment to their long-term support.

Decision 4: Strengthen structured digital information systems at NMN and WIND, and allow Namibians the widest possible access to biosystematic information without compromising data quality or security.

Decision 5: Establish cost-effective ways to get the largest possible proportion of Namibian taxonomical literature available in country, either in hard copy or digital format.

While action on each of these respective decisions will be useful, clearly the possibility of a 'Biological Survey' is the central catalyst that could facilitate all the others. It is therefore necessary to examine what the **possible enabling framework** for such an institution should be.

- It should be a statutory entity promulgated by an Act of Parliament.
- Government should fund salaries and basic running costs. The actual extent of annual Government funding is to be specified in the Act. It is suggested that the average of the previous 5 years' budgets of the comprising institutes, expressed as a percentage of the National Budget, be used.
- In reciprocation the Biological Survey will be expected to satisfy the Government's biosystematic service requirements at no cost.
- Since a Biological Survey would not fit comfortably in any existing ministry, an autonomous body resorting under the Office of the Prime Minister may be appropriate.
- The Survey should be launched with sufficient staff and infrastructure to function effectively.
- The Survey should be allowed to generate additional income from non-governmental sources. Such income should be deposited into a trust fund to be used for research and staff development.
- Should Government require additional biosystematic services in future (*e.g.* for currently 'unmandated organisms'), the staff and financial implications of rendering such services are to be negotiated between the parties.
- Change can be traumatic, and the concerns of current staff would need to be addressed with the utmost sensitivity. The preservation of corporate identity in the comprising institutions, until such time as a new identity evolves, would be essential. Ultimately, consolidation should be a joyous union, not a shotgun marriage.

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Palmatogecko rangei, another of Namibia's special reptiles.

References

Barnard, P. (ed.) 1998. *Biological diversity in Namibia - a country study*. Namibian National Biodiversity Task Force, Windhoek.

Craven, P. (ed.) 1999. A checklist of Namibian plant species. *Southern African Botanical Diversity Network Report* No. 7: 1-204. SABONET, Windhoek.

Government of Namibia. 2002. *Biodiversity and Development in Namibia. Namibia's ten-year strategic plan of action for sustainable development through biodiversity conservation 2001-2010, Barnard, P., Shikongo, S. & Zeidler, J. (eds).* Government of Namibia, Windhoek.

Illbury, C. & Sunter, C. 2001. The Mind of a Fox - Scenario planning in action. Human & Rousseau / Tafelberg, Cape Town. pp. 141.

Maggs, G.L., Craven, P. & Kolberg, H.H. 1998. Plant species richness, endemism, and genetic resources in Namibia. *Biodiversity and Conservation* 7: 435-446.

Merxmüller, H. (ed.) 1966-1972. *Prodromus einer Flora von Südwestafrika*, Parts 1 - 175. J. Cramer, Lehre.

Noongo, N., Reinikeinen, T., Smit, W. & Hashiyana, E. 2002. *EMIN II. Environmental monitoring and indicator's network.* Ministry of Environment & Tourism, Windhoek.

Pallet, J. (ed.) 1995. *The Sperrgebiet. Namibia's least known wilderness. An environmental profile of the Sperrgebiet or Diamond Area 1, in south-western Namibia*. DRFN and NAMDEB, Windhoek.

Smith, G.F., Steenkamp, Y., Klopper, R.R., Siebert, S. & Arnold, T.H. 2003. The price of collecting life. *Nature* **422**: 375-376.

Steenkamp, Y. & Smith, G.F. 2002. Addressing the needs of the users of botanical information. *Southern African Botanical Diversity Network Report* No. 15: 1-56. SABONET, Pretoria.

Van Wyk, A.E. & Smith, G.F. 2001. *Regions of floristic endemism in southern Africa. A review with emphasis on succulents*. Umdaus Press, Hatfield.

Visser, W. 2000. Opinion. Sinking roots into ethical grounds of business. *Sunday Times Business Times* June 18: 24.

Sponsor, donor, institutional and other relevant web sites

AFRICOM	http://www.african-museums.org/
BioNET International	http://www.bionet-intl.org/
BWG	http://www.dea.met.gov.na/programmes/biodiversity/workgroups.htm#Biosystematics
CBD	http://www.biodiv.org/
GBIF	http://www.gbif.org/
GEF	http://www.gefweb.org/
GRN	http://www.grnnet.gov.na/intro.htm
GTI	http://www.biodiv.org/programmes/cross-cutting/taxonomy/default.asp
GTZ	http://www.gtz.de/
Heja Game Lodge	http://www.natron.net/tour/heja/lodgee.html
ICOM	http://icom.museum/
ICCROM	http://www.iccrom.org/
InBIO	http://www.inbio.ac.cr/es/default.html

IUCN	http://www.iucn.org/
Namibia Breweries Ltd.	http://www.nambrew.com/newvisitor.asp
NBI	http://www.nbi.ac.za/homepage.htm
NBP	http://www.dea.met.gov.na/programmes/biodiversity/biodiversity.htm
NBRI	http://www.sabonet.org/countries/namibia.html
NMN	http://www.natmus.cul.na/index.html
SABONET	http://www.sabonet.org/
SAFRINET	http://www.natmus.cul.na/safrinet, http://safrinet.ecoport.org
SAMP	http://www.sampmus.org/
SARDEP	http://www.gtz.de/laender/ebene3.asp?Thema=8&ProjectId=75&Reihenfolge=4&spr=2
UNDP	http://www.undp.org/
Waltons	http://www.waltons.co.za/

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Quelea quelea, the Redbilled Quelea, one of Namibia's 649 bird species.

Acronyms and Abbreviations

AFRICOM	International Council of African Museums
BDTF	Biodiversity Task Force, NBP, Namibia
BWG	Biosystematics Working Group, BDTF, NBP, Namibia
CBD	Convention on Biological Diversity
DRFN	Desert Research Foundation of Namibia
DSS	Directorate Scientific Services, MET, Namibia
EIA	Environmental impact assessment
FENATA	Federation of Namibian Tourism Associations
GBIF	Global Biodiversity Information Facility
GEF	Global Environment Facility
GIS	Geographical Information Systems
GRN	Government of the Republic of Namibia
GTI	Global Taxonomy Initiative
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
ICOM	International Council of Museums
ICCROM	International Centre for the Study of the Preservation and Restoration of Cultural Property
IUCN	International Union for Conservation of Nature and Natural Resources
InfoCom	Information and Communication Service for Sustainable Development in Namibia, an MET project
MAWRD	Ministry of Agriculture, Water and Rural Development, Namibia
MBESC	Ministry of Basic Education, Sport and Culture, Namibia
MET	Ministry of Environment and Tourism, Namibia
MFMR	Ministry of Fisheries and Marine Resources, Namibia
MoF	Ministry of Finance, Namibia
MWTC	Ministry of Works, Transport and Communication, Namibia
NBI	National Botanical Institute, Pretoria
NBRI	National Botanical Research Institute, Namibia
NBP	National Biodiversity Programme, Namibia
NEEN	Namibian Environmental Education Network
NIED	National Institute for Educational Development, Namibia
NFSI	National Forensic Science Institute, Namibia
NGO	Non-governmental organisation
NMN	National Museum of Namibia
NRC	Namibia Resource Consultants
OPM	Office of the Prime Minister, Namibia
PPRI	Plant Protection Research Institute, Agricultural Research Council, Pretoria
PRE	Herbarium, National Botanical Institute, Pretoria
RDL	Red Data List(s)
SABONET	Southern African Botanical Diversity Network
SADC	Southern African Development Community
SADCAMM	Southern Africa Development Community Association of Museums and Monuments
SAFRINET	SADC Network of BioNET International
SAMP	African-Swedish Museum Network
SARDEP	Sustainable Animal and Range Development Programme
SPMNDB	Specimen database of WIND
TAP	Tree Atlas Project, Namibia
UNAM	University of Namibia
UNDP	United Nations Development Programme
WIND	National Herbarium of Namibia, Windhoek

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