

# Invasion risk assessment in tropical ecosystems

An introduction to assessing the risks of plant invasions and prioritizing management

Workshop Report

Amani Nature Reserve: 14<sup>th</sup> – 18<sup>th</sup> May 2007



The workshop was part of the Darwin Initiative project on Combating Invasive Alien Plants threatening the East Usambara Mountains, Tanzania

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## List of Abbreviations

ANR	Amani Nature Reserve
IAPs	Alien Invasive Plant Species
NGOs	Nongovernmental organisations
NPPO	National Plant Protection Organisation
PRA	Pest Risk Assessment
SUA	Sokoine University of Agriculture
TAFORI	Tanzania Forestry Research Institute
TANAPA	Tanzania National Parks
TAWIRI	Tanzania Wildlife Research Institute
TBA	Tropical Biology Association
UDSM	University of Dar es Salaam
WCST	Wildlife Conservation Society of Tanzania
WRA	Weed Risk Assessment

## Executive summary

The workshop was the second in a series of 3 workshops forming part of the Darwin Initiative funded project “Combating Invasive Alien Plants threatening the East Usambara Mountains, Tanzania”. It

aimed to teach Tanzanian conservation biologists up to date techniques in the risk assessment of invasive alien plant species. A total of 14 participants from 9 institutions attended. Teaching was through interactive lectures, practical exercises, presentations, discussions and posters. 5 participants presented work that had been stimulated by the 2006 workshop and carried out in the intervening year. The workshop was also informed that several participants had held seminars on alien plants at their institutions following the last workshop. All 14 participants rated the workshop as “excellent” and commented that the knowledge gained from the workshop will be “very useful” or “useful” in their work back at their institutions. Key emerging issues from the workshop were that there is a need to (i) create more awareness on the threats invasive alien plants pose and (ii) compile national and regional information on alien plant species and their distribution in Tanzania. Participants recommended that future workshops should cover management of invasive alien plant species, and techniques for monitoring and ecological restoration of areas with invasive plants.



Participants go through a consensus building exercise on risk assessment

### Introduction and summary

The workshop was the second in a series of three training workshops forming part of the Darwin Initiative funded project “Combating Invasive Alien Plants threatening the East Usambara Mountains, Tanzania”. It was jointly organised by the Tropical Biology Association (UK and Kenya), the National Centre for Advanced BioProtection Technologies of the Lincoln University (New Zealand) in collaboration with the Amani Nature Reserve, Sokoine University of Agriculture, Tanzania Forestry Research Institute and the Forestry and Beekeeping Division of the Tanzanian Government.

The workshop aimed to teach Tanzanian conservation biologists up to date techniques in the risk assessment of invasive alien plant species (IAPs). Specifically, it served to:

- illustrate the concept of risk assessment
- provide instruction in the use of software for the analysis of the different types of risk posed by invasive plants
- illustrate ways of developing priority lists and management goals for invasive alien plants

boost attendees' understanding of invasive plant species ecology and management  
build institutional capacity as new skills are transferred after the workshop  
catalyse links between ecologists working on invasive species

## Progress since the 2006 workshop

Several projects were initiated as a result of the 2006 workshop. For example, three research projects were started (two are still ongoing) and several awareness seminars were held at different institutions while one education poster was printed in English and Swahili.

## Participants and teaching methods

The workshop built on skills provided by the first workshop held in 2006. A total of 14 (9 male and 5 female) Tanzanian conservation scientists attended. Of these, 9 had attended the 2006 workshop while 5 were new participants selected from 15 applications received mainly from TAWIRI, TAFORI, TANAPA, SUA and Forestry and BeeKeeping Division. These institutions were targeted because of their engagement in research, management and control of invasive alien plants.

Workshop participants represented 9 institutions (and 11 Departments or Units; Table 1). Participants ranged from park ecologists and forest research officers, to lecturers. 7 and 6 participants had masters and bachelors level of education, respectively.

The workshop timetable is given on page 8. Teaching was through interactive lectures, practical exercises, presentations and discussions by experts from the collaborating institutions and a guest speaker from Tanzania's Ministry of Agriculture. 7 participants gave talks and 2 presented posters on their work on IAPs. The posters and 3 of the participants' talks were on work that had been stimulated by the 2006 workshop and carried out in the intervening year.

### Workshop discussion seminar

In the last section of the workshop, participants were divided into breakout groups that discussed the following questions: 1) To what extent are invasive species a priority in your organisation relative to other issues

(judged by level of funding, number of projects, etc.)? Has this changed since we asked you this question last year? 2) a) What are the main things you have learned on this workshop? b) Of the things you have learned, which would you like to apply back home in your work? What would you need to facilitate this?

3) A priority activity that has been mentioned in both workshops is to compile a list of alien invasive plant species and their locations in Tanzania. How would you generate such a list? What kinds of information would you need? What information sources could you use?

4) Of the things you have learned on the workshop, what would you like to apply between now and the end of the project in March 2008? Give details about who, what and how. 5) What topic(s) should the final workshop cover?

Feedback from the discussions is provided in Appendix 2.

## Assessment of workshop

All participants rated the workshop as "excellent" (question (e)) and that they learnt a lot (question (f)). A good majority (86%) felt that the knowledge gained from the workshop will be very useful in their work back at their institutions. All indicated that they would apply the knowledge and skills gained from the workshop afterwards (question (h)) in several ways, including running awareness programmes,

undertaking risk assessments, new research, etc. A detailed summary of the participants' feedback and comments are contained in Appendix 1.

Participants received a certificate of participation.

### Level of knowledge of invasive alien plants and emerging issues from the workshop

Participants' feedback indicated that knowledge on invasive alien plants in Tanzania was relatively low. The majority (85%) thought that, a moderate number to a lot of gaps, exist in their institutions on the understanding of alien plant species ecology and their management. Key emerging issues from the workshop were that there is need to (i) create more awareness on the threats IAPs pose and (ii) compile national or regional lists of IAPs and their distribution in Tanzania. Several participants indicated their keen interest to initiate activities tackling these issues back at their institutions. 71% of the participants recommended management of IAPs as a key topic for a future workshop while 36% and 29% said research and monitoring techniques and restoration of areas invaded by invasive species, respectively were key needs for future workshops.

### Workshop follow up activities

Participants were invited to apply for a followup grant to enable them to put their new skills and ideas into practice after the workshop. Interinstitutional collaboration was identified as an important, but not exclusive, requirement for those applying to the grant. Outputs from the grant will be presented at the third and final workshop in 2008.

Table 1: List of workshop participants

Participant	Sex	Institution	Department
Balama Chelestino	M	Tanzania Forestry Research Institute	Morogoro Office
Edward Ezekiel	M	Sokoine University of Agriculture	Forest Biology
Hagwet Martina B.	F	College African Wildlife Management	Mweka
John Jasson R.	M	University of Dar es Salaam/ Wildlife Conservation Society of Tanzania	
Mathew Mathayo M.	M	Forestry and Beekeeping Division	Amani Nature Reserve
Pima Nancy E.	F	Tanzania Forestry Research Institute	Lushoto Silviculture Research Center
Richard John	M	Tanzania Forestry Research Institute	Lushoto Silviculture Research Center
Mndolwa Ahmed	M	Tanzania Forestry Research Institute	Lushoto Silviculture Research Center
Andrew Samora M *	M	Sokoine University of Agriculture	Forest Biology
Mvungi Esther F.	F	University of Dar es Salaam	Botany
Penga Halima R. *	F	Tanzania National Parks	Sadaani National Park

Banga Paul B. *	M	Tanzania National Parks	Udzungwa Mts. National Park
Nkya Hassan M. *	M	Tanzania Wildlife Research Institute	Head Office, Arusha
Aloyce Hildergarde *	F	Wildlife Conservation Society	Lunda Mkwambi Wildlife management Areas

\* new attendees not on the first workshop in 2006

Table 2: List of workshop teachers and resource people

Name	Institute
Mr Corodius Sawe (CS)	Amani Nature Reserve
Dr. Rose Mohamed (RM)	Ministry of Agriculture, Tanzania
Dr Pantaleo Munishi (PM)	Sokoine University of Agriculture
Prof. Phil Hulme (PH)	National Centre for Advanced BioProtection Technologies, Lincoln University, New Zealand
Dr. Rosie Trevelyan (RT)	Tropical Biology Association
Mr Anthony Kuria (AK)	Tropical Biology Association
Mr Wayne Dawson (WD)	Aberdeen University



Working on a prioritization exercise Participants seeking clarification  
Training workshop programme

(Teacher/resource person's initials as in Table 2)  
th

Monday 14May 2007

- 15:30 Introduction to the course and its aims (PH/RT)
- 15:45 Participants' introductions
- 16:00 Talk: Assessing the risks of invasive plants: what do we need to know? (PH)
- 16:45 Talks from participants: case studies of invasive alien plants in different sites in Tanzania a) Halima (TANAPA): Alien plants in Sadaani b) Banga (TANAPA): The case of *Tectona grandis* in Udzungwa c) Poster: Mathayo (ANR): Farmers' attitudes to *Cedrela odorata* d) Jasson/Hagwet (WCST/Mweka): *Acacia mearnsii* in Mbulu highlands e) Nkya (TAWIRI): Prickly pears in the Serengeti
- 19:00 Finish
- 19:30 Welcome (CS) Dinner

th

Tuesday 15May 2007

08:30 Talk: Weed Risk Assessment (WRA): Concepts and Approaches (PH)  
09:30 Break  
09:45 Introduction to the Weed Risk Assessment Scheme (PH)  
10:15 Coffee  
10:45 Group exercise: using the WRA for selected species in Tanzania  
13:00 Lunch  
14:00 Group exercise contd.  
16:00 Results of exercise: problems, challenges and decisions  
17:00 Break  
17:15 Talk: Castilla elastica invasion in Amani (Richard):  
17:30 Talk: What leads to the naturalisation and spread of alien trees in Amani? (WD)  
19:00 Dinner

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Wednesday 16May 2007

08:30 Introduction to the NPPO style Pest Risk Assessment (PRA) system (PH)  
09:30 Break  
09:45 Group exercise: using the NPPO style PRA system for two species in Tanzania  
10:45 Coffee  
11:30 Review of the scheme – Q&A session  
12:00 PRA exercise contd.  
13:00 Lunch  
15:00 NPPO Panel Meetings: Building consensus across species risks  
15:30 Tea  
16:00 Talk: Assessing risks of introduced plants (RM)  
16:45 Finish  
19:00 Dinner  
19:45 Lecture: Associations of alien and indigenous species (Ezekiel/PM)

th

Thursday 17May 2007

08:30 Talk: Prioritizing species for management (PH)  
09:30 Group discussions to strategise group exercise  
10:30 Coffee  
10:45 Prioritization field exercise  
13:00 Lunch  
14:00 Prioritization field exercise  
15:30 Tea  
17:00 Results of prioritization exercise: group presentations  
18:30 Talk: Integrated Weed Risk Assessment: a Mediterranean example (PH)  
19:00 Dinner

th

Friday 18May 2007

08:30 Break out groups: lessons learned and way forward (RT)  
09:00 Group photo and coffee  
11:00 Group feedback: the way forward  
12:45 Lunch & Depart

## Appendix 1: Participants feedback questionnaires

Number of respondents: 14

About invasive alien plants

a) How much gap do you think exists in your institution on understanding of alien plants species ecology and management? What areas

Response options % respondents

Notatall 0

A little 14

A moderate 64

A lot 22

[gaps areas identified]

Extent of spread (including in botanical gardens) and level of impacts to the environment; understanding

magnitude of the problem

- There is no comprehensive list of invasive species in the National Parks in Tanzania
- Lack of knowledge on best control and management measures, particularly mechanical or biological
- Lack of adequate monitoring and management
- Lack of understanding impacts on biodiversity and ecological services
- Most people are not aware how to assess the invasiveness and manage it
- General lack of awareness on AIP, screening and risk management of the AIP

b) Other than your institution, which other Tanzanian institutions do you know, that are involved in work on invasive alien plants?

- Agricultural Research Institute
- Amani Nature Reserve
- Forestry and Beekeeping Division
- Ministry of Agriculture
- Mweka [Collage African Wildlife Management]
- National Environment Management Council
- [Forestry Training Institute] Olmotonyi
- Sokoine University of Agriculture
- Tanzania Forestry Research Institute
- Tanzania National Parks
- Tanzania Pesticide Institute
- Tanzania Wildlife Association
- Tanzania Wildlife Research Institute
- University of Dar es Salaam
- [Tanzania's] Vice President's Office
- Wildlife Division
- Tanzania Commission for Science and Technology
- Ngorongoro Conservation Area Authority
- Others: forestry training colleges, local communities, universities and higher learning institutions

Workshop teaching: lectures and practicals (for each question, please mention any aspects that you found particularly useful)

c) How did you rate the teaching on the workshop?

Response options % respondents

Very poor 0

Poor 0

Average 0

Good 7

Excellent 93

[Aspects that participants found useful]

number of respondents

Tools of Weed/Pest Risk Assessment 2

Screening 1

Ecology of different alien invasive species 1

d) How did you rate the practicals?

Response options % respondents

Very poor 0

Poor 0

Average 7

Good 7

Excellent 86

Overall

e) How did you rate the workshop overall?

Response options % respondents

Very poor 0

Poor 0

Average 0

Good 0

Excellent 100

f) On the workshop, how much do you feel you have learnt?

Response options % respondents

A little 0

A moderate 0  
A lot 100

g) Will the knowledge gained on the workshop be useful in your work back at your institution? (give reasons)

Response options % respondents

Not useful 0

Some what useful 0

Useful 14

Very useful 86

[Reasons given]

Assist [me] in teaching and research as the main component of my daily work

I will create awareness to other members of the staff and suggest what to do in order to know alien species in my area

The knowledge will help in planning and doing research that will be useful for my career and increase awareness among my colleague about the threat to our ecosystems

[will] enable [me] to conduct surveys of IAPs, [and apply] skills of assessment

Because biological invasion is a new, little researched, area of study in my institute, this knowledge will help me to start [new] research on IAPs

Because I have gained knowledge and skills which are very practical and can be used easily when understood

At first, I did not know where to start but now after the workshop, I do know how I can deal with alien species

[it provides an] entry point for writing fundable projects [on issues of IAPs]

And after the workshop

h) Do you think you will use the knowledge and skills gained from the workshop afterwards?

Response options % respondents

No 0

Yes 100

[If yes, how]

Through posters, seminar

Presentation, followup research

Deal with alien species in my work area

In my research especially on invasive species

Doing WRA, PRA, ranking of invasive species

Conduct assessment on alien invasive species and provide awareness to other stakeholders

Through developing a list of invasive alien species found in Tanzania

Initiate fundable projects to the topic in my institution

Produce a TV program just before March 2008, to create awareness to the public on threat that may be

caused by IAPs

Sharing with other students, collaborating with institutions dealing with natural resources, use some examples acquired from the workshop

The knowledge will be useful during the botanical survey in the work in a particular Eastern Arc Mountains.

i) Would you like to participate in similar workshops in future, and if so, on what topics?

Response options % respondents

No 0

Yes 100

[Topics proposed for future workshops] % of respondents for the topic

IAS research and monitoring techniques and ecological data management 36

IAS Management including case studies and best practices 71

Restoration of [invaded] landscapes, etc 29

Awareness creation on ecological impacts of IAS 7

Status of alien species in protected areas 7

Monitoring and evaluation of invasive control mechanisms 7

General comments on the workshop by participants [quoted as presented]

"it was so nice to be one among the participants. I congratulate you all for your good cooperation, interactive and for your constant communication, etc"

"the workshop has been fantastic"

"I am very grateful TBA, through this workshop; we managed to learn vital issues which will help us in our

research in the future management of IAP”

“I am really happy to congratulate all... (resource people) for the nice and well coordinated workshop”

“Followup should be made to encourage participants implement various activities as taught”

“keep up the course going to make a difference”

“I am very grateful to the TBA for organising and for funding the workshop. I have learned lot and knowledge

gained is for sure really practical”

“the workshop was very well organised and conducted”

“more practical work on mapping invasive alien species by GIS [Geographical Information System] and GPS

[Global Positioning System]”

“Provide equipment for monitoring the invasive alien species – databases, computers, etc”

“To have more workshops on IAP management”

“We appreciate the workshop”

## Appendix 2: Feedback from breakout discussions

Participants were divided into groups that represented, in as much as possible, the type of work they do. The groups and results of their discussions are detailed below.

Group A: SUA / UDSM [group represented academic institutions]

Edward	Ezekiel	M	Sokoine University of Agriculture
Andrew	Samora	M	Sokoine University of Agriculture
John	Jasson	M	UDSM/ WCST
Mvungi	Esther F.	F	University of Dar es Salaam

Group B: TAFORI [group represented research institutions]

Balama	Chelestino	M	TAFORI
Pima	Nancy Eliad	F	TAFORI
Ahmed	Mndolwa	M	TAFORI
Richard	John	M	TAFORI/ SUA

Group C: Wildlife [group represented wildlife managers and researchers]

Hassan	Nkya	M	Tanzania Wildlife Research Institute
Hildegard	Aloyce	F	Wildlife Conservation Society
Hagwet	Martina Boay	F	College African Wildlife Management Mweka

Group D: TANAPA & Nature Reserves [conservation management institutions group]

Paul	Banga	M	TANAPA Udzungwa
Halima	Penga	F	TANAPA Sadaani

Matayo	Mpanda	M	ANR
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## Groups' feedback

1a) To what extent are invasive species a priority in your organisation relative to other issues (judged by level of funding, number of projects, etc.).

Priority is still low but increasing. TANAPA and ANR, however have high priority on IAPs.

In some instances, priority is high but funds to implement programmes are limited, or information on what species are invasive and extent of invasion is lacking.

1b) Has this changed since we asked you this question last year?

Some institutions have set aside more funds for work on IAPs

TANAPA sets annual budget for relevant and feasible alien species control and management, as well as assessing spread and impacts of IAPs in protected areas. This has created good levels of awareness among park managers and staff.

- Progress is hampered by lack of awareness among researchers. Weak curriculum. E.g. at Mweka, curriculum review is needed to include invasion ecology. The department of Wildlife Management at SUA invasive ecology as a course rather than full unit Limited numbers of proposals focusing on IAPs.

- Progress, especially in creating awareness, has been achieved through Sharing reports from the Darwin training workshops with colleagues giving presentations and seminars e.g. Ezekiel and Mvungi

Long and short term projects on IAPs, e.g.:

- a student from UDSM did research on *Cedrela odorata* at Kiboza forest reserve
- Mathew Mpanda conducted a short project on *Cedrela odorata* in ANR support through the Darwin Initiative Project

- Frankfurt Zoological Society funded work on *Opuntia* spp, *Aloe* spp, in Serengeti, Ngorongoro, etc

More students and university lecturers have shown increased interest in IAPs research

- Production of awareness materials. Mvungi produced a poster on IAPs in Tanzania to be distributed to various institutions

2a) What are the main things you have learned on this workshop?

- New and applicable tools for identifying IAPs and ranking their impacts through prioritisation (WRA, PRA, and prioritisation/ranking systems) techniques

- Prioritisation of IAPs and pests for further management with limited resources and the role this process plays in justifying funding needs

- Impacts of invasive species on biodiversity

- The importance of phytosanitary measures and the processes of screening IAPs and pests during importation and exportation and the stakeholders engagement in the process, in Tanzania

- Techniques for assessing risk posed by IAPs as well as controlling invasion and spread

- Importance of networking for institutional collaboration and team work

- New experiences, knowledge, ideas from participants.

- Challenges facing authorities and the Ministry of Agriculture in Tanzania in controlling alien species introductions including issues of porous borders, inadequate personnel and machinery, etc.

2B) Of the things you have learned, which would you like to apply back home in your

work.

Carry out risk assessments on potential invasiveness of alien plants species in Tanzania and especially identify areas of priority in the Eastern Arc biodiversity hotspot

Collaborate with Plant Health Services (PHS) to create awareness to minimise introductions as well as conduct seminars targeting participants' home institutions, colleagues and students

Conduct botanical surveys to identify potential invasive species and update Tanzania's list of IAPs

Control invasions and spread

Apply WRA, PRA and prioritisation schemes and test their efficacy as IAPs management tools

Convince more students to take up research on different aspects of IAPs in their studies

Initiate curriculum review and introduce courses in invasive species to train more people

What would you need to facilitate this?

- Funding to (i) create awareness within organisations (through posters, TV programmes, seminars, etc)

(ii) pay subscriptions for compendiums, (iii) to undertake research, etc.

Access to literature, information and tools for risk assessment work.

Capacity in (i) personnel to manage IAPs and conduct research, (ii) facilities and equipment (e.g. GPS, computers, computer software, etc).

Review of the different policies to accommodate issues on invasive species.

Mentoring and feedback when writing proposals and fundraising.

Improved and working networks of individuals and institutions especially at national level.

Opportunities: workshops, training, etc

3a) A priority activity that has been mentioned in both workshops is to compile a list of alien invasive plant species and their locations in Tanzania. How would you generate such a list?

By identifying existing alien species, their abundance and distribution

Make an inventory of IAPs with the help of resource people (expert and local knowledge in Tanzania), field surveys

Collect primary information by doing ground truthing, rapid surveys, etc.

Review literature and institution information available from National Environment Management Council (NEMC), NGOs dealing with environmental issues, etc to get existing lists.

collaboration with key institutions

3b) What kinds of information would you need? 3c) What information sources could you use?

Information needed

Likely sources of information

- Botanical surveys, Tanganyika notes and record

- Forestry and agricultural research institutions e.g.

journals

TAWIRI, TAFORI,  
Herbarium, etc

- Technical reports

- Environmental NGOs e.g. TFCG, WCST, TBA, etc

- Literature on ecology and biology, origin, native

- District forestry and agricultural office

and current distribution range of IAPs in Tanzania

- Plant Health Services

Plant taxonomy and descriptions

- Weeds of East Africa

- Key impacts of target species to the environment

- Expert knowledge (Frontier, Researchers, etc) and

Possible control measures

Local people's knowledge

- Pathways of introduction

- Tanzania's parks and reserves

- Crop Protection Compendium

- Relevant websites, literature and compendiums

1 Of the things you have learned on the workshop, what would you like to apply between now and the end of the project in March. Give details about who, what and how

5. What topic(s) should the final workshop cover?

Impacts of various management options and technologies including case studies on use of different management techniques e.g. chemical, mechanical and biological controls

Utilization regimes. Managing IAPs e.g. *Cedrela odorata* that are considered useful to humans

Dissemination of the findings and creating positive public awareness on pros and cons of alien plants

Monitoring and evaluation techniques for IAPs management and control

Landscape restoration with examples from different habitats

Effects of environmental pressures e.g. climate change on plant invasions

Simulation ecology in predicting future impacts and threat of invasions on ecosystems

Ecological data management including data analysis

Mapping alien species distribution as to give the real picture of levels of invasions

Best practices in invasive control and management

Things you would like to do before March 2008	Who	What	How
Carry out a botanical survey to identify potential IAPs in one of the Eastern Arc Mountains	TAFORI research team in collaboration with forestry and agricultural offices in the respective district	Generate a list of alien plant species	<ul style="list-style-type: none"> <li>• Conduct ecological inventory</li> <li>• Household questionnaires</li> </ul>
Run 1 TV programme on SUA TV	Balama	IAPs in the ANR	<ul style="list-style-type: none"> <li>• presentation</li> </ul>
Create awareness on IAPs	All	on impacts of IAPs	<ul style="list-style-type: none"> <li>• through website articles targeting SUA, TAFORI, TAWIRI, TANAPA, Mweka and other websites</li> <li>• articles on institutional newsletters</li> </ul>
Do risk Assessment in the Ngorongoro Conservation Area	Nkya, Aloyce and Martina under TAWIRI	on IAPs	<ul style="list-style-type: none"> <li>• Apply screening techniques and knowledge gained</li> </ul>
Seek information on current IAPs status in Tanzania's ecosystem		Identify priority areas for further studies	
Undertake intensive study on IAPs to identify risk and prioritise management actions based on threat levels	Halima Penga	Survey alien species in Sadaani park Literature review	<ul style="list-style-type: none"> <li>• Data/report compilation</li> <li>• Give management recommendations</li> <li>• Implement management actions</li> </ul>
Research on abundance, and spread of <i>Cedrela odorata</i>	Mathew Mpanda	Research on <i>C. odorata</i>	<ul style="list-style-type: none"> <li>• Depends on methods</li> </ul>
Survey of IAPs in Udzungwa Mts. National Park	Paul Banga	IAPs	<ul style="list-style-type: none"> <li>• Apply PRA, WRA and ranking system</li> <li>• Implement management actions</li> </ul>
Share information	John and Ezekiel	IAPs in the Eastern Arc	<ul style="list-style-type: none"> <li>• Through websites</li> <li>• Through the Invasive Species Network for Africa</li> </ul>

### General comments from the plenary

Curriculum reviews: invasive ecology is offered as a topic in some courses in very few Tanzanian institutions e.g. at Wildlife Management Department, SUA. Such topics should be upgraded to full units and offered at different Tanzania's universities, including Mweka.

Individuals should apply lessons learnt and seek collaboration in their work

There is appreciable levels of awareness on IAPs and more researchers are attracted to work on invasive E.g. Alex Kisingo is writing proposals with Martina.

IAPs are featured on TAWIRI's strategic plan but given low priority

- ANR (i) gives IAPs high priority and has included it in its annual work plans with some matching funding

(ii) gives priority to student working on IAPs but also direct students to take on research in IAPs and (iii) does not apply physical IAPs control measures owing to conflicting findings.

TANAPA (i) also takes IAPs issues seriously, (ii) in 2006, supported 7 research projects; Projects are funded through parks budgets that are approved at TANAPA Headquarters. Park ecologists plan and budget for work they want to do and apply through the Ecological Monitoring department. Project support is for protected areas nationwide

### Appendix 3: Contact details of the workshop participants and teachers

Participants	E-mail	Address	Institution
Ahmed Mndolwa	mndolwa_sa@yahoo.co.uk	P O Box 95, Lushoto, Tanzania	Lushoto Silviculture Research Centre Research Institute
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