



Woody invasive alien species in Eastern Africa

Assessing and mitigating their impacts on ecosystems and rural livelihoods

Working with a Local Implementation Group in mitigating Invasive Alien Species in East Usambara, Tanzania

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The place and the problem

The East Usambara Mountains consist of a network of 18 mountain blocks covering an area of 263km² that are covered by tropical rainforests, harboring many endemic plants and animals such as the Usambara eagle-owl (*Bubo vosseleri*), the Usambara akalat (*Sheppardia montana*) and the African violet (*Saintpaulia ionantha*). East Usambara is a water catchment area for many rivers and the source of freshwater to more than 200,000 people in the nearby town of Tanga.

The integrity of East Usambara is threatened by invasive alien species (IAS), the most noxious ones being lantana (*Lantana camara*), clidemia (*Clidemia hirta*), maesopsis (*Maesopsis eminii*) and the native bracken (*Pteridium aquilinum*). These species were introduced deliberately as ornamental plants or for economic purposes in the Amani Botanical Garden. However, due to poor management, forest disturbance and unsustainable farming practices, some of them escaped and invaded agricultural fields and forests (Binggeli et al., 1998; Dawson et al., 2008). IAS are threatening the biodiversity of East Usambara forests, increase costs of land preparation and weeding and reduce overall productivity in agricultural lands.



Lantana camara invasion in a sugar cane field adjacent to Amani Nature Reserve.

Solving the problem with the community

For many years, efforts to mitigate IAS did not produce the desired results due to poor adoption of the practices recommended by scientists. These practices lacked social acceptance as they were introduced through a top down approach, without engaging local stakeholders (Schwilch et al., 2012).

In the Woody Weeds project, we apply a structured decision taking method, which brings together a diverse group of stakeholders to address environmental issues. The methodology was developed for use in the EU DESIRE Project (Schwilch et al., 2009; Bachmann et al., 2007), but modified to suit the local context in the East Usambara.

First, we identified a Local Implementation Group (LIG), composed of 15 stakeholders from

various categories such as land users, technicians, conservation groups, government leaders and researchers.



The members of the Local Implementation Group at Amani Nature Reserve.

Then we organize three stakeholder workshops to: 1) identify existing sustainable land management (SLM) practices and potential solutions for mitigating IAS, 2) evaluate and document the SLM practices toward IAS mitigation, and 3) jointly select SLM practices for test implementation.

During the first workshop, the LIG identified issues with two alien and one native invasive species that need to be addressed: 1) Protection of forest and agricultural lands against invasion by lantana, bracken and clidemia; 2) Development of sustainable practices for mitigating the existing populations of IAS.



*LIG members describing the invasion process of *Lantana camara* in agricultural fields.*

The LIG identified five SLM practices for managing IAS, which will be evaluated and tested through field trials.



Slash-and mulch was identified as a potential land management practice for mitigating IAS.

Lesson learned

- The methodology was helpful to ensure full involvement of non-scientific partners and local stakeholders, to identify SLM practices and to foster knowledge exchange between the project and outsiders. For example, while the project is mainly dealing with woody IAS, the LIG recommended the inclusion of non woody weeds such as bracken.
- Stakeholders acknowledged the importance of mutual learning in understanding the invasion process and IAS impacts and identifying solutions. Many examples were given of projects that have failed because of insufficient local stakeholder involvement.
- IAS are perceived differently by almost all stakeholders. For example, 80% of the LIG members disagreed on the categorization of *Cedrela odorata* as IAS, with some seeing it as beneficial and others as a nuisance.
- A serious communication gap exists between farmers and agriculture extension officers. One officer complained that farmers were not adopting the SLM practices he recommends. The farmers responded that practices were not practicable because they were either too expensive or incompatible with existing practices and culture.

References

- Schwilch, G., Bachmann, F., Graaff, J., (2012). Decision support for selecting SLM technologies with stakeholders. *Journal of applied geography*. 34, 86-98.
- Goodland, T.C.R., Healey, J.R., Binggeli, P., (1998). Control and management of invasive alien woody plants in the tropics. School of Agricultural and Forest Sciences, University of Wales, Bangor, UK.
- Schwilch G., Bachmann F., Liniger H.P., (2009). Appraising and selecting conservation measures to mitigate desertification and land degradation based on stakeholder participation and global best practices. *Land Degradation & Development* 20: 308–326.
- Bachmann F., Schwilch G., Gabathuler E., Liniger H.P., (2007). *Guidelines for WB3 Part I: Stakeholder workshop 1. Identification of existing and potential prevention and mitigation strategies*. Centre for Development and Environment (CDE), University of Bern, Switzerland. Report Number 6 of Manuals and Training Guides, DESIRE Project
- Fowler, S., Nyambo, B., (1995). Surveying of invasive weeds affecting biodiversity in the forests of the East Usambara Mountains, Tanzania. *East Usambara Catchment Forest Project* 20:16.
- Dawson, W., Mndolwa, A., Burslem, D.R.P., Hulme, P., (2008). Assessing the risks of plant invasions arising from collections in tropical botanical gardens. *Biodiversity Conservation* 17: 1979–1995.
- Hamilton, A.C., Bensted-Smith, R., (1989). Forest Conservation in the East Usambara Mountains Tanzania. IUCN, UK.