



# USING WATER HYACINTH TO IMPROVE LIVELIHOODS AND RESTORE FRESHWATER ECOSYSTEMS



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## About this publication

*This is one of the series of brochures aimed at experience sharing on ARCOS NBCEs Programme. Other case studies produced include:*

- *Community Managed Tree Nursery Centers for Water, Energy and Food Security*
- *Building Community Ownership and Institutional Development*
- *Nature Based Village as a model for transformation towards sustainable community development*
- *Nature Based Community Enterprises as means to create jobs for youth*
- *Using water hyacinth to improve livelihoods and restore freshwater ecosystems*
- *The benefits of market-oriented agriculture to women*
- *Sustainable Energy Access in Rwanda's Rural Areas*

## About ARCOS Network

Established in 1995, the Albertine Rift Conservation Society (ARCOS Network) is an non-governemntal organisation working with NGOs, Governments, Community-Based Organisations and the Private Sector, established in 1995 with the Mission "To enhance biodiversity conservation and sustainable management of natural resources through the promotion of collaborative conservation action for nature and people". ARCOS has programmes extending in the Albertine Rift region, Africa Great Lakes and African Mountains.

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## ARCOS Strategic Areas 2016-2020 at a glance





## 1. THE CHALLENGE

In Africa, Water hyacinth was first recorded in the 1890s in the River Nile in Egypt, but has since become widespread throughout the continent (GISP, 2004). In 1955, colonial policy was enacted to ban its cultivation in Rwanda, unfortunately by that time, it had already escaped from cultivation. Water hyacinth was officially reported to have established a self-sustaining population in Mukungwa valley in 1987 (Gashamura 2009). Later, it invaded lakes such as Kivu, Cyohoha, Ruhondo, Burera, Mugesera and Rweru, as well as Akagera river and its tributaries. Generally, the water hyacinth infestation increases siltation of rivers and dams, the weed adversely affects the quality of drinking water and creates conditions

suitable for pathogens. The thick mats formed on the surface of water increase competition with aquatic biodiversity for light and oxygen that results in massive decline in freshwater population both fauna and native flora, as well as drop of water levels. Besides, these mats inhibit boat traffic, fishing and recreational activities. They also clog irrigation canals and pumps, and threaten hydroelectric power schemes.

In Rwanda, small lakes in Akagera National Park have reportedly dried out due to water hyacinth invasion. According to Rwanda Environment Management Authority (REMA), lake Cyohoha used to be a large lake until the year 2000 when the encroaching water hyacinth has nearly halted all fishing

activities that are vital to the livelihoods of about 30,000 communities, reduced the water quantity and made the water undrinkable, leading to an acute water shortage in the region.

Since 1990s, efforts to control water hyacinth in Rwanda were implemented through Lake Victoria Environmental Management Program (LVEMP), as well as different governmental and non-governmental initiatives. Biological control was attempted during the early 2000s by introducing two species of weevils (*Neochetina eichhorniae* Warner and *Neochetina bruchi* Hustache, Coleoptera: Curculionidae) (Moorhouse et al, 2001). However, it was the 2008-2014 mechanical removal campaigns that considerably (though temporarily) reduced water hyacinth impacts on

Lake Burera, Mukungwa Valley and Lake Cyohoha (J.P. Ndagijimana, pers. comm. 2013).

Although water hyacinth infestations are associated with a variety of socio-economic and environmental impacts, they can be transformed into a source of income and other benefits for communities. This case study will look at livelihoods and ecological impacts of using water hyacinth to make handcrafts and manure, taking into consideration two Nature Based Community Enterprises (NBCEs) operating in Akanyaru and Akagera wetlands in Ntarama and Musenyi sectors, in Bugesera district in Rwanda. These NBCEs are Cooperative Inyenyeri pour le Transport Maritime de Kibungo (CITMK) and Koperative Sugira Musenyi (KOSUMU)”.





### *2.1. ARCOS' approach and goals*

As embedded in ARCOS' Motto "Collaborative Action for Nature and People", collaboration with stakeholders is a key element towards sustainability. It is in this context that through participatory approach, ARCOS Network has facilitated Sustainability Agreement (SA), a twelve years performance and benefit-based contract signed between ARCOS Network, local government and

each NBCE among KOSUMU and CITMK. This partnership started in 2016 and it aims at promoting business enterprises of these NBCEs, enhancing environmental resilience in their areas of operation and building networks with other community groups to share knowledge and experience. Using water hyacinth as handcraft and manure while restoring freshwater ecosystems is one of the initiatives promoted through this partnership.



### ***α. ARCOS Network Approach and Goals:***

ARCOS' community development programme adopts a holistic understanding of the socio-ecological system and helps the community to build vision of success based on sustainability principles and rooted in the cultural heritage. ARCOS works with Nature Based Community Enterprises (NBCEs) through a model structured around four but interrelated components that make the situation more approachable.

The BEST Approach (ARCOS 2015) focuses on four key areas:

***B: Building leadership and sustainable institutions.*** Cooperative management, governance, setting targets and work plans, gender and youth inclusiveness.

***E: Enhancing environmental resilience.*** Promoting Community Based Adaptation through sustainable agriculture, enhancement and protection of soil and water ecosystems and biodiversity, forest landscape restoration, ecosystem-based adaptation, promotion of green energy technologies.

***S: Sustainable business solutions.*** Assisting NBCEs in business planning, value addition, private sector engagement, market linkages and quality certification.

***T: Transforming and inspiring others.*** ARCOS and empowered NBCEs focus on Nature Based Villages (NBVs), demonstration sites in integrating sustainable environment and livelihoods practices. This is supported through a Nature Based Community Fund (NBCF) established to foster sustainability actions in each NBV through community loans, incentives and activities of common benefits. ARCOS also promotes community to community exchange through training workshops, exhibitions and exchange visits where communities share knowledge and experience and learn by doing.

### 3. Implementation and Process

At first step, the members of both NBCEs passed into a series of trainings covering all the components of BEST. The purpose of these trainings was to allow cooperative members to understand the principles by which the success and sustainability of cooperatives are shaped. Hands-on trainings were also conducted to enhance capacity of cooperative members in nursery development and management, grafting, and in best water hyacinth harvesting and treatment techniques to limit the spread of this aquatic invader and to make marketable handicrafts and manure.

The training sessions were built on knowledge and skills exchange between trainers and trainees and full participation of members at every step of the process was a key factor towards the success. Different site visits were conducted to allow cooperative members to learn sustainable actions that could be duplicated in their respective landscapes and learn diverse issues on-ground and to suggest key recommendations and identify their roles in implementing these recommendations. These visits were also an opportunity for them to put into practice different techniques learned during theoretical sessions.

Additionally, other initiatives to enhance community livelihoods, environmental

resilience and business enterprises of these NBCEs were promoted and integrated into their operations. These initiatives included: Tree nursery development by both cooperatives, rain water harvesting at household level, erosion control and organic farming promotion at cooperative level, as well as business support by providing different assets including land, buildings and different equipment used in water hyacinth harvesting and treatment. The equipment consisted boats, sewing machines, ropes, tissues, varnish, paints and picklocks.

Furthermore, the cooperatives were also facilitated to make Strategy and Business Plans for three years since 2018. These Strategy and Business Plans integrate institutional, environmental, business and transformational aspects to ensure sustainability in these NBCEs' operations.

In addition, a Community-to-Community Exchange was conducted to allow different community groups to learn from each other's experience and practices building on four components of BEST. This Community-to-Community Exchange brought together 41 participants from 30 community groups from Rwanda, Uganda and Burundi. These groups constitute the ARCOS' NBCE Learning Group.



## 4. Achievements and Impact

### *a) Main achievements:*

- All (81) members of both NBCEs trained in institutional sustainability and transformational principles building on four components of BEST
- 20 members from both NBCEs trained in water hyacinth harvesting and treatment
- 16 members trained in grafting of fruit seedlings and 4 engaged in full process of tree nursery development
- Two (2) tree nurseries developed by both cooperatives and about 39,000 seedlings dominated by grafted fruit species, agroforestry and indigenous species produced and planted by local communities in eight (8) neighboring villages
- Different and new handcrafts produced and sold locally and countrywide. Meanwhile, both cooperatives are under market negotiation to access bigger markets and better prices
- Around 0.5 tons of mixed vegetables and 800kg of maize produced on 0.5 ha by KOSUMU using manure produced on basis of water hyacinth
- Both NBCEs actively participate in raising awareness of local communities in sustainable wetlands management and restoration, as well as in promoting environmental resilience and sustainable livelihoods practices

### ***b) Key Impacts***

- Governance and leadership structures of both cooperatives are in place, transparent and stable
- Membership increased for CITMK from 14 members to 67
- Awareness of cooperative members in climate-smart and environmental resilience practices considerably enhanced and their livelihoods improved through handcraft, organic horticulture and other sustainable practices
- Capacity of cooperative members in water hyacinth removal and treatment considerably increased
- Water hyacinth removal exercised on about 0.7ha in Akanyaru wetlands and 0.4ha in Akagera wetlands and the activity is yet ongoing
- Annual turnover of both cooperatives increased from 0 to 2Mil for KOSUMU and from 1.5Mil to 7Mil for CITMK through a variety of business alternatives
- About 100ha of land restored through soil protection, water resources management, organic farming and agroforestry practices
- Awareness and participation of local communities in nature-based livelihoods and climate resilient activities highly improved
- Knowledge of local communities in water hyacinth impacts and benefits improved and their engagement in removing the weed and using it as raw material in different livelihood activities is growing.





- Community engagement in water hyacinth control and ecosystem restoration through BEST Approach requires strong investment in terms of time, funds and hard work, however the commendable results are worth it.
- Stakeholder collaboration is key towards the success of environmental restoration and sustainable community livelihoods initiatives.

## 6. CHALLENGES AHEAD

- More communities are getting interested in using water hyacinth as fodder, manure and handcraft material, however most of them do not have enough skills to harvest and treat the plant, which may contribute to spreading it further
- The unceasing mismanagement of wetlands increasingly gives rise to favorable conditions for the spread of water hyacinth and other invasive species

# 7. CONCLUDING REMARKS

The water hyacinth is one of the most dramatic and far-reaching aquatic invaders in the world and its infestations are associated with a variety of socio-economic and environmental impacts. Control measures include among others biological, chemical and mechanical weed control, awareness campaigns, fencing to hold the plant, etc. Manual removal was reported considerably (though temporarily) reducing water the population and impacts as well as contributing to job creation in Rwanda.

Despite the abovementioned impacts associated with the water hyacinth, the latter can be transformed into a source of income and other benefits for communities. As a readily available resource endowed with a variety of properties, water hyacinth can be used in different industries such as textile, energy, water purification, agriculture and handcraft.

As learned through the initiative, water hyacinth can be used alone or combined with other materials available locally to diversify and add value to handcraft

end-products. In better ways, using water hyacinth as handcraft should be paired with agriculture, to maximize the use of harvested weed and minimize risks to disperse it downstream.

In this case study, poor skills and lack of investment at community level were identified as major limiting factors towards the promotion of this initiative. However, through collaborative action, community can be empowered and assisted to develop a multidisciplinary business using water hyacinth as primary input and providing a wider range of end products and services that contribute at the same time on livelihoods improvement and freshwater ecosystem restoration.

This case study was part of the project “Using Water, Energy and Food Security Nexus to Promote Climate Resilient Decisions and Model Actions in Selected Landscapes Along Akagera Basin”. This project was implemented by the Albertine Rift Conservation Society (ARCOS Network) with funding from the Rwanda’s Green Fund (FONERWA).

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