



World Food Programme

SAVING LIVES
CHANGING LIVES



Photo: Collecting water hyacinth using a canoe (Gabriela Vivasqua/WFP)

Sustainable fuel for cooking

Turning the world's worst water weed into wealth

WFP in South Sudan

Background

Firewood and charcoal are the main sources of cooking fuel in South Sudan, and within the Sudd areas, these resources are increasingly scarce and expensive; a large cost burden for vulnerable households. Firewood collection also comes with many gender and protection concerns as it is women and girls who often have to travel long distances in insecure areas to look for trees. Cooking with dirty cookstoves, charcoal and wood on open fires exposes households to toxic smoke. According to WHO, this results in about 3.8 million deaths every year.

The water hyacinth, an extremely fast-spreading aquatic plant that has invaded much of the swamps, lakes, and Nile tributaries in South Sudan contains valuable properties that make it a sustainable alternative to firewood for producing cooking fuel. Also known as the world's worst water weed, it is a non-native plant with adverse effects on the environment and society, impacting waterways and ecosystems, even causing siltation and flooding. Turning it into a safer, inexpensive and income-generating source of cooking fuel can improve local livelihoods, restore aquatic food systems and control its proliferation.

Objective

WFP is piloting a targeted, market driven systems approach to sustainable fuel solutions in South Sudan using the water hyacinth. This project provides a model to produce bioenergy for sustainable cooking, which creates a high impact, high return on investment by providing fuel for communities living close to bodies of water. This will have a multiplier impact on markets and livelihoods by introducing a new source of cooking fuel and production model that is income generating and more cost-effective than traditional charcoal. Collecting water hyacinth for bioenergy will also help clear blocked waterways for improved access, transport and trade, and facilitate the return of aquatic food systems. The cleaner fuel will produce less of the toxic smoke when cooking and will save women and children from the added burden of traveling long and dangerous distances to collect firewood. The time and money saved could be invested in other more efficient activities.

The initiative consists of three closely related components:

1. Design production models on transforming water hyacinth into bioenergy to support families with affordable access to safe and sustainable cooking fuel and turn them into income generating opportunities to bring to market.
2. Build energy-efficient cooking stoves from easy-to-find locally available material for improved cooking.
3. Build affordable small canoes from easy-to-find locally available material to collect water hyacinth and clear waterways.

Challenges



Resource Constraints. Chronic shortage of firewood and fuel in South Sudan and high prices in flooded areas



Protection. Women and children are forced to travel increased distances to collect firewood (walking or swimming in flooded areas for 3-17 km) putting them at risk of gender-based violence and other protection risks



Environment. Collection of firewood causes deforestation and the invasive water hyacinth blocks waterways and affects ecosystems



Climate Change. When water hyacinth decomposes, it releases large quantities of methane into the environment, and South Sudan is one of the largest natural emitters of methane in the world



Livelihoods. Water hyacinth and lack of fuel notably harms livelihoods of communities in the Sudd



Health. The smoke from cooking without proper stoves using firewood and charcoal causes significant health risks



Photo: Women collecting firewood (Mirna Franic/WFP)

Solution: Produce affordable, clean and renewable bioenergy for cooking with the invasive water hyacinth and locally-built energy efficient stoves



Photo: Gabriela Vivacqua/WFP

The Project

The project is currently being tested and rolled out in Bentiu, Unity State.

- ◆ There are two primary production methods to create energy from water hyacinth for cooking: (1) drying water hyacinth, carbonizing it and mixing it with a binder before pressing it into briquettes; and (2) grinding dried water hyacinth and mixing it with cow dung in a biodigester to produce gas.



Photo: Producing briquettes (Gabriela Vivacqua/WFP)

- ◆ Trials were conducted on briquette production using water hyacinth and clay energy-efficient stoves for the most successful approach and testing was deemed successful. For the second production method, a biogas for cooking fuel proof of concept will be trialed during the next phase.
- ◆ A prototype canoe was built out of local materials to reduce costs and increase boat production.

The project is being rolled out through two models:

- ◆ WFP engaged groups in the IDP camp to produce water hyacinth briquettes for household consumption. The goal of this model is for these groups to scale up production and create a small enterprise to sell the product on the market to generate income.
- ◆ WFP engaged Parent-Teacher Associations to produce bioenergy to cook the school meals provided at school. This model will reduce the burden on parents who are required to send their children to school with firewood and allow the school to sell surplus product on the market to reduce the need to sell school garden vegetables to cover expenses.



Photo: Producing fuel-efficient stoves (Gabriela Vivacqua/WFP)

Partnerships. WFP is working together with partners on the ground and engaging with the community in Bentiu to collect water hyacinth, test the production of briquettes as proof of concept, work with boat makers, assess acceptability by local community, and produce locally made energy efficient stoves.

- ◆ WFP is engaging a local NGO to organize the trained groups into a small enterprise for income generation in Bentiu as well as for the training and testing of biodigester in Juba.
- ◆ WFP is exploring potential business models involving local actors to create microenterprises and bring the product to market for the continuous sustainable production of water hyacinth charcoal.
- ◆ Following engagement with academia, private sector and other institutions to help develop the optimal prototype, machinery and process for water hyacinth bioenergy, WFP will now engage with local universities and private sector to help disseminate the related science and technology.
- ◆ This project is also exploring options to work with boat makers to produce locally made boats to facilitate transport and for use in collecting water hyacinth from water bodies.
- ◆ WFP will continue to engage with the community, particularly community leaders, to fast track the adoption of the product and ensure a clear understanding of potential and bottlenecks.

What's next

1. Scale up and increase the engagement and production of bioenergy through groups in the IDP camp and PTAs in WFP supported schools.
2. Together with locally identified partner, train participants on entrepreneurship to create small enterprises through which the briquettes will enter the market as an alternative fuel source to regular charcoal. Engage with PTAs to strengthen capacity on business practices and budget management to use the product within schools and bring it to market in an impactful manner.
3. Disseminate know-how and value added of these solutions (briquettes and stoves) through WFP programmes to increase awareness and generate interest in the production and consumption of the product—leveraging WFP's extensive coverage to reach critical mass.
4. Engage WFP private partners (transporters) to work and complement the newly created water hyacinth value chain as they open waterways and collect biomass, ultimately improving efficiency and helping bring the solution to scale to meet demand.



Photo: Carbonized briquettes (Gabriela Vivacqua/WFP)