Policy Brief | Towards sustainable solutions for beach wrack use and recycling

Highlights

Beach wrack collected from managed beaches in the Baltic Sea Region could be used as a valuable resource in the blue bioeconomy. Seven CONTRA case studies have highlighted viable uses for beach wrack and the effect of beach wrack removal on the local environment. This brief recommends policy which:

- supports beach wrack, that is collected from managed beaches, being defined as an organic resource, and not as a waste product,
- encourages local authorities to develop more sustainable beach wrack management strategies,
- encourages local authorities to cooperate with local recycling companies and,
- presses for more research and development on possible beach wrack uses

This brief recommends policy for beach wrack that is already removed from managed beaches. The CONTRA project recommends that beach wrack, on natural unmanaged beaches, generally remains untouched, unless it poses an environmental or health concern.

What is beach wrack?

Beach wrack is any marine generated organic material that is washed up onto the beach by waves and currents. It can generally be found along the edge of the water, along the shore, and sometimes at the back of the beach especially after storms. The beach wrack that is found on any local beach is a result of what grows offshore, currents and the weather conditions. In the Baltic Sea it usually consists of torn off sea grass, macroalgae (brown, red and green species) and shells.

Beach wrack is a natural occurrence along the coast of the Baltic Sea countries. It plays an important role in protecting a beach from erosion caused by wind and wave action, providing a habitat and feeding ground for certain species and is also an essential nutrient source for dune vegetation.

Beach wrack management in the Baltic Sea

Large amounts of beach wrack on Baltic Sea beaches are seen as a nuisance by tourists and residents. Beach wrack can obstruct access to the sea and can give off an unpleasant odour when decomposing at the water's edge. Local authorities therefore remove beach wrack from managed beaches, often at a great cost.

Some common beach wrack practices used by coastal municipalities are:

- to collect, temporarily store, and then push the beach wrack back into the sea;
- to collect and move beach wrack further up the coast or inland to decompose away from the main tourist beach area;
- to remove it from the beach and dispose of it as waste;
- or to remove it from the beach and give it to farmers/landowners to use as fertilizer or soil improvement

These management methods are not always ideal from an environmental perspective. They do not adequately take advantage of beach wrack as a resource or potential for coastal water quality improvement. Little attention is given to the possibilities of using beach wrack.

CONTRA – Converting Beach Wrack from a Nuisance to a Resource and Asset

The Interreg BSR funded project CONTRA addresses the challenges associated with beach wrack in the Baltic Sea region. Read more about CONTRA here: www.beachwrack-contra.eu

Demonstration of innovative beach wrack uses

Case Study 1
Soil improvement products, Bad Doberan/Poel, Germany

Beach wrack can be co-composted to produce soil improvement products and is a promising recycling solution for mixed beach wrack. Cooperation with the local beach management authority is necessary to secure a supply of beach wrack.

Case Study 2
Bio-coal, Island Rügen, Germany

Beach wrack is suitable for the production of biochar. However, current collection methods leave large amounts of sand in the wrack which negatively affects the quality of biochar. A biochar processing plant using beach wrack as co-component may be economically feasible if a CO_2-tax is present.

Case Study 3
Compost for methane-mitigating biocovers, Køge Bay, Denmark

A biocover made from compost reduced methane emissions at a landfill near Køge Bay. Compost made from beach wrack can live up to standards for use in biocovers, but more research is needed on its effect on methane oxidation rates.

Case Study 4
Dune restoration, Kaliningrad Oblast, Russia

Beach wrack can be used as soil improvement/fertilisation for dune restoration and hence coastal protection. Beach wrack compost has doubled the growth of the investigated plants in the dune.

Case Study 5
Biochar and biogas, Kalmar, Sweden

Tests demonstrate that beach wrack is suitable for use in gasification/pyrolysis. Beach wrack has a high concentration of inorganic components, requiring a proper gasification process. To improve biomethane conversion yield, water pre-treatment is recommended to remove sand and salt inhibition. Variation in beach wrack biomass composition also affects the gasification process.

Case Study 6a
Impact of beach wrack on ecosystem, Puck Bay, Poland

Beach wrack can be a source of enhanced zinc and chromium. Low oxygen concentration inside the biomass pile, can foster the release of contaminants from beach wrack. These conditions can initiate transformation of e.g. mercury to more toxic compounds like methylmercury. Thus, removing beach wrack can help rid the environment of harmful components and excess nutrients that cause eutrophication.

Case Study 6b
Reed bed system for beach wrack management, Swarzewo, Poland

Beach wrack can be treated in a reed bed system (RBS). In the RBS integrated processes of dewatering and stabilization of beach wrack as well as reject water (from dewatering) treatment occur. Thus, there is no harmful impact on the environment. Beach wrack processed in the RBS can be used as soil conditioner or fertilizer. Thanks to its natural appearance, the RBS can be built near to the beach so transport of beach wrack can be limited. The solution is low maintenance and no chemicals are needed.

For more information on the case studies please see the report 05.1 "Case studies for innovative solutions of beach wrack use" on www.beachwrack-contra.eu/publications/

Obstacles for beach wrack recycling – Results of the CONTRA case studies

Beach wrack is being removed during beach cleaning operations on most tourist beaches in the Baltic Sea region. Therefore, it is important that sustainable solutions for beach wrack use are supported by policy. The case studies have covered a broad range of options and have revealed certain obstacles for the further use of beach wrack:

Collect, store and transport logistics are challenging

Beach wrack, especially when it is fine fragmented macroalgae, is difficult to collect, store and transport as it is wet and often mixed with high amounts of sand (of up to 80% of weight share).

Storage facilities and collection machinery are costly

Temporary storage facilities and collection machinery are costly to purchase/maintain and often too expensive for local authorities, particularly in rural areas. There are cases, e.g. in Germany, where government grants (county level) have been made available for the purchase of such facilities, but the cost of maintenance is left for local authorities.

Current collection methods are not use-orientated

Local authorities are not using methods to collect beach wrack which could improve/support further processing.

Collection technologies need further development

Local authorities may not have access to the appropriate collection equipment, especially for fine particulate beach wrack. Use-oriented collection technologies need further development. A higher degree of collaboration is needed between authorities and businesses.

No specific legislation for beach wrack reuse/recycling

Collected beach wrack falls under waste regulations in certain Baltic Sea countries, even if the user intends to use the material. Products produced by material classified as waste may have a lower value. There is no specific legislation concerning the use of beach wrack for marketable products. This can lead to barriers as beach wrack is treated according to standards which are not applicable.

Lack of knowledge

There is a lack of knowledge about beach wrack quantities, composition, levels of contamination and how this varies spatially and temporally. Beach wrack may in some areas be contaminated by pollutants, making it unfit for certain recycling options.

Policy recommendations – What is needed for sustainable solutions

To overcome the identified obstacles, the CONTRA project has, based on the results of the case studies, developed the following policy recommendations:

Develop policy for beach wrack management

Local authorities should develop policy which encourages a use-oriented collection of beach wrack. Such policy should address the environmental impacts of beach cleaning and refer to beach wrack as a valuable resource. Beach wrack management policies should discourage practices such as transporting beach wrack to waste treatment facilities and the disposal of it as waste. In the future, the decision to clean a beach and thus to collect beach wrack should involve the consultation of environmental scientists.

Develop legislation which is flexible to intended use of beach wrack

Legal frameworks relating to the collection, storage, transport, and treatment of beach wrack should be amended to be flexible to the intended use of the material. Any legal classification of beach wrack should not unnecessarily hinder its sustainable use, but nor should it encourage unsustainable harvesting of beach wrack from natural unmanaged beaches.

Consider beach wrack in fertilizer legislation frameworks

Beach wrack should be considered in fertilizer legislative frameworks. However, further research and analysis is needed on the advantages and disadvantages of using beach wrack as organic fertilizer and soil conditioner. Particular attention should be paid to the presence of heavy metals, litter and other pollutants.

Allow for direct use of beach wrack for coastal protection

Legislation should allow for the direct use of certain amounts of beach wrack in situ, on a local beach. These amounts should not be larger than the natural land loads on the respective beach. Direct use could include depositing small piles of beach wrack at the back of the beach for soil improvement or fencing for dune restoration.

Encourage cooperation with businesses

Local authorities should be encouraged to cooperate with companies who can process beach wrack. This could include a focus on providing long-term contracts on the supply of beach wrack to ensure companies have a reliable material source. Furthermore, the collection technologies need to be improved to make collection more efficient, less fuel consuming and to reduce the amount of collected sand.

Encourage more research and development

Policies should encourage more research and development for different uses of beach wrack. It should also promote geographically specific research to support local decision-making processes. Such research could include:

- Seasonal and spatial monitoring of beach wrack amounts and composition on a wider scale than before on the coasts
- Nutrient and pollutant release from beach wrack to the local environment (water, sediments and soils)
- The effect of beach wrack removal practises on the local environment

CONTRA
BALTIC BEACH WRACK
CONVERSION OF A NUISANCE TO A RESOURCE AND ASSET

Interreg
Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

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