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Analysis of waste hierarchy in the European waste directive 2008/98/EC

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ABSTRACT

Loss of recoverable resources in linear resource flow systems is likely to contribute to the depletion of natural resources and environmental degradation. The 'waste hierarchy' in the European Commission's latest Waste Framework Directive 2008/98/EC (WFD2008) makes recommendations on how to address this issue. The WFD2008 is analysed in this work for its adequacy in ensuring return of 'recoverable waste' as a 'resource' into the productive system. Despite the release of guidance documents by the DG Environment, DEFRA and WRAP UK on the interpretation of key provisions of the WFD2008, lack of clarity still exists around the WFD2008 'waste hierarchy'. There is also an overlap between measures such as 'prevention' and 'reduction', 'preparing for reuse' and 'reuse' and lack of clarity on why the measure of 'reuse' is included in the WFD2008 definition of 'prevention'. Finally, absence of the measures of 'recovery' and 'reuse' from the WFD2008 'waste hierarchy' reduces its effectiveness as a resource efficiency tool. Without clarity on the WFD2008 'waste hierarchy', it is challenging for decision makers to take direct action to address inefficiencies existing within their operations or supply chains. This paper proposes the development of an alternative 'hierarchy of resource use' and alternative 'definitions' that attempt to fill identified gaps in the WFD2008 and bring clarity to the key measures of waste prevention, reduction and recovery. This would help the key stakeholders in driving resource effectiveness, which in turn would assist in conservation of natural resources and prevention of environmental degradation.

1. Introduction

In order to enable a dialogue between consumers, policy makers and researchers about the different categories of 'waste', there needs to be a clear understanding about the definition of waste itself, its prevention, its reduction and recovery options. There is particularly a lack of clarity in the literature between the different measures that can be applied for the prevention, reduction and recovery of 'waste'. In an attempt to clarify this, the authors consider the latest version of European Commission's Waste Framework Directive 2008/98/EC (hence forth referred to as WFD2008) which makes recommendations on the treatment of not only end of life waste but also recommends a 'waste hierarchy' that is applicable across the 28 member states of the European Union. The WFD2008 'waste hierarchy' captures various measures that could be applied to substances, materials and/or objects before and/or after it has become waste. As in the case of all directives, the WFD2008 is legally binding on the member states to which it is addressed.

Current waste management practices are strongly influenced by the 'waste hierarchy', which recommends a priority order from the most preferred option of 'prevention' at the top to the least preferred option of 'disposal' at the bottom. However, there are limitations to the 'waste hierarchy' as an enabler of sustainable development. These limitations are extensively debated by a number of researchers. For example, Price and Joseph (2000) observed that the 'waste hierarchy' at the time was inadequate in meeting the goals of sustainable development as it requires reduction in the usage of resources including energy along with reduction in the generation of waste. More recently, Van Ewijk and Stegemann (2014) concluded that the current 'waste hierarchy' was good for avoiding waste disposal by landfill, but inadequate in its ability to reduce consumption of natural resources and impact on the environment.

Establishing a consistent definition of 'waste' has been a long debated issue in the field of waste regulation, both in the case of European Commission's Waste Framework Directives (Tromans, 2001); and in the case of the Resource Conservation and Recovery Act of the United States (Gaba, 1989). Identifying and defining the

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various stages of 'waste' is an unresolved challenge (Butti, 2012). If waste categories are clearer and the ways in which the wastes can be used are properly codified, then it is likely that the valuable 'resources' contained in the waste could be recovered more effectively.

In the context of the WFD2008, 'waste' means "any substance or object which the holder discards or intends to discard or is required to discard". In general, waste is perceived negatively as something to be discarded, but is often reused when its value is recognised. However, a number of researchers describe 'waste' as a 'resource'. For example, the resource value of 'waste' has enabled people in developing countries to make a living with a current trend which is increasingly shifting from the concept of 'end-of-pipe waste management' to a more holistic approach of 'resource management' (Wilson, 2007). Similarly, Zaman (2014) highlights how the use of holistic 'zero waste' management systems where 'resources' that are transformed into 'waste' as a result of human consumption activities can be redirected back into the production process. The importance of focusing on 'waste as resource' has been promoted by contemporary ideas such as closed loop or circular materials economies that reinforces the notion of a 'resource based' paradigm instead of a 'waste based' paradigm (Park and Chertow, 2014). Also, the environmental and economic opportunities offered by the use of carbon containing 'waste' as a 'resource' are substantial (HOL, 2014). In spite of the immense possibilities of using 'waste' as a 'resource', one of the main challenges in achieving such a shift in paradigm is not only in deciding when a 'waste' comes into being as observed by Butti (2012) but also when it can be 'recovered' and treated as a 'resource'.

The main goal of waste regulations has been to establish a proper balance between the dual objectives of conserving natural resources on the one hand and protecting the environment on the other (Tromans, 2001). The balance is between the over-regulation and under-regulation of 'waste' that may happen if it is defined too widely or too narrowly. Unclear or over-regulation of waste will hinder its 'reuse' and therefore lower the possibility of saving natural resources, whereas under-regulation of waste can result in environmental harm being done due to the careless handling and reuse of waste. Although the WFD2008 supports 'circular thinking' to some extent, there is a lack of clarity within the 'waste hierarchy' of "prevention, preparing for re-use, re-cycling, other recovery and disposal" (Fig. 1). The authors of this paper describe some areas of disparity and present potential changes to the hierarchy that improve clarity and provide the basis for improvement in the 'wastes' that could be transformed into 'resources'.

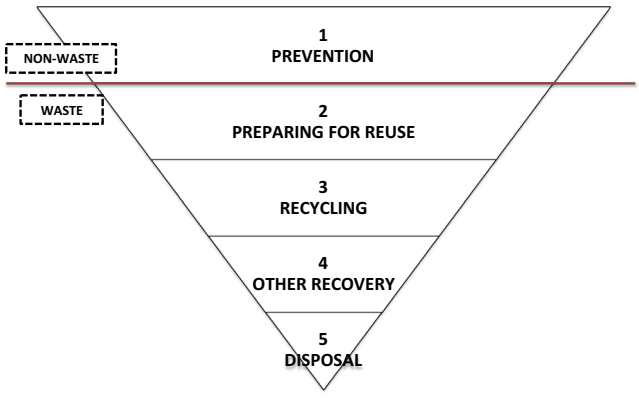

Fig. 1. Waste hierarchy as in the WFD2008.

2. Method

The recommended 'waste hierarchy' and definitions of various measures contained in the DIRECTIVE (2008) document are taken as the basis for this analysis. Further clarification of terms and ideas are taken from 'Guidance on the interpretation of key provisions of Directive 2008/98/EC on waste', which was issued by the European Commission's Director General of Environment in 2012. The WFD2008 literature is also compared with publications from the UK's Department for Environment Food and Rural Affairs (DEFRA) and Waste and Resources Action Plan (WRAP), two key organizations that work in the area of waste prevention, reduction, recovery and disposal. The guidance documents WRAP (2011), DEFRA (2011) and DG-ENV (2012) have been studied to assess if there is uniformity in the understanding of the 'waste hierarchy' and the definitions of different measures in WFD2008. In reviewing these documents, conceptual gaps and disparities are identified and these are used to identify potential improvements. Interpretation of the definitions of various measures and operations from different sources are captured in Table 1. Existing definitions of the different measures are analysed on the principle that the definition of any measure should be based on its 'primary purpose'. As an example, it is questionable whether the definition of 'prevention' in the WFD2008 does sufficiently focus 'primarily' on the 'prevention' of: the consumption of scarce natural resources; the resultant waste that is generated; the environmental impact; the impact on human health or the effect on society.

Our objective is to answer some of the key questions, which arise from analyses of the WFD2008 'waste hierarchy' and its definitions of various measures and operations; specifically we ask why:

- Does the WFD2008 definition of the measure of 'prevention' emphasise 'reduction' rather than 'prevention'?
- Is the measure of 'reuse' included in the WFD2008 definition of 'prevention'?
- Measures such as 'reuse' and 'recovery' are defined in the WFD2008 but not included in the WFD2008 'waste hierarchy'?
- A measure such as 'preparing for reuse' is included in the WFD2008 'waste hierarchy', while the important measure of 'reuse' itself that logically follows it and is generally more resource efficient than 'recycling' is excluded?
- A measure such as 'repairing' that results into 'reuse' of a product, is included in the WFD2008 definition of 'preparing for reuse' and not considered as one of the options for 'reuse'?

3. The waste hierarchy in the WFD2008

Article (4) of the WFD2008 describes the 'waste hierarchy' as comprising of five measures; prevention, preparing for reuse, recycling, other recovery (e.g. energy recovery) and disposal. Guidance documents issued in the UK by DEFRA and WRAP describes this hierarchy in the form of a reverse triangle (Fig. 1) and also offers clarifications on the steps within the waste hierarchy.

Each of the stages in the 'waste hierarchy' and the definition of different measures and operations are described in the WFD2008. Table 1 summarises the definitions of various measures and operations as defined in the WFD2008 and as interpreted by DG Environment of the European Commission, DEFRA and WRAP.

4. Analysis of the WFD2008 waste hierarchy

Some aspects of the WFD2008 'waste hierarchy' (laid out in Fig. 1 and summarised in Table 1) appear inconsistent. The WFD2008 defines waste as being "any substance or object which